BTL-5000 SWT Series

SERVICE USER GUIDE

101PL01/12/2008EN

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BTL-5000
Shockwave Series

USER´S MANUAL

101IE30/07/2008EN

BEFORE YOU START

Thank you for showing your interest and buying our device the BTL- 5000 SWT Series. We hope you will be satisfied and thanks to you, this device will help many patients.

All of us at BTL wish you every success with your BTL- 5000 SWT Series. We pride ourselves on being as responsive as possible to our customers' needs. Your suggestions and comments are always welcome since we believe an ongoing relationship with our customers is critically important to our future product line. Please call or email us your suggestions.

While we would like you to start using your equipment right away, we encourage you to thoroughly read this manual in order to fully understand the operational features of the BTL-5000 SWT system.

Again, thank you for being a BTL customer. In the event of any problem, or if you require service, please make an initial call to your local distributor, who will decide whether to refer the problem to our office.

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1 GENERAL CHARACTERISTICS OF THE DEVICE

The **BTL -5000 SWT Series** is a modern device enabling the application of therapies by using no invasive shockwaves. Shockwaves are one of the most effective ways of treatment of pain connected to the musculoskeletal system. Today, this is the second most frequent reason of absence from work.

The **devices** are equipped with a colour touch screen on the **main unit**, and considerably simplifies the use of the device. The touch screen is equipped with a touch pen for easy operation of the device. A vertically positioned device enables you to see the information on the screen clearly from different servicing positions. In addition, the brightness of the display can be adjusted to suit the light conditions in the office or the health centre. The information displayed on the screen will guide you throughout the whole therapy, simply adjust the parameters by pressing the touch screen buttons and turning the knobs on the device.

Selecting a diagnosis from a list of alphabetically organized treatment protocols, or selecting a program, will make an easy and efficient start to the therapy. You can adjust any treatment parameter manually by the simple use of the touch screen buttons. Throughout the whole therapy, the device informs you about the therapeutical method used, type of treatment, number of applied shocks, total and remaining shocks, frequency used, intensity and other necessary data.

Save your time by using the predefined programs of the **main unit**. Based on detailed research and practical use of the device, the well-organized predefined protocols will present recommendations for treatment of various conditions.

The **BTL- 5000 SWT** allows you to insert the names of your clients and other relevant information into the internal memory of the device and connect the client data with predefined or your own protocols. When your clients call again, simply recall their name and apply the pre-set therapy.

With every BTL-5000 SWT you can purchase a trolley specially designed for the BTL products. Its design offers maximum comfort of storage and use of the device. Four steady wheels provide simple movement of the device in the office or the health care centre.

The trolley includes a range of accessory containers and baskets.

Please visit our corporate website at http://www.btlnet.com for the latest information on BTL products and services.

1.1 BTL – 5000 SWT SYSTEM SERIES

The device consists of three units: the main unit, the compressor unit and the applicator.

- Main system – BTL- 5000 unit, which includes the main microcomputer and software for control of the whole equipment, including user encyclopaedia and the therapy guide.
- Compressor – apart from the compressor there is also the complete electronics attached for the regulation of the ballistic pressure.
- Applicator – ergonomical applicator simplifies the „course of" the therapy, following the instructions of the main unit.

The system enables the connection of two applicators. Each applicator can contain a different transmission element, differing in its size and characteristic. Thereby the system features an advantage of service abilities for two different therapies, with no need to change the transmission elements. However, only one applicator can be active at a time. It is not possible to use two applicators together, at the same time.

1.2 SHOCKWAVE AND ITS CHARACTER

The shockwave is defined as a wave with a rapid increase of pressure in a very short time and gradual decline with a phase of small negative pressure.

Shockwaves are aimed at the affected areas that are the cause of chronic pain. The influence of shockwaves leads to for example dissolution of calcic deposits and better vascularisation, and in its final effect it causes relief of pain.

Outside the client's body (extracorporeally), a pressure pulse with a high amplitude is generated, and its energy is concentrated into the target area in the body. The pressure pulse without major losses travels through a water medium to the client and penetrates soft tissue.

The pressure course of the shockwave in time expressively differs from the pressure course of the harmonic sound wave. The shockwave is compared to the ultrasonic waves particularly characterized by a pressure jump change, higher amplitude and non-periodicity.

In the shockwave, the positive amplitude is generally much bigger than the negative amplitude. The frequency rate of the shockwaves is usually low (Hz units) and eventual cavitation (disturbance of material consistency – rise of cavities) will relax. Consequently there is no threat of energy exhaustion on cavitations as in the case of continuous ultrasound.

A substantial part of the shockwave energy penetrates into liquid (of the organism) with a great positive pressure pulse. Its diffusion is only limited by the actual tissue absorption and eventual reflections on acoustic inhomogeneities.

The shockwave is defined as a pressure pulse with these characteristics:

- High positive pressure amplitude – 10 to 1000 MPa = 100 to 1000 Bar (100x atmospheric pressure)
- Low negative pressure amplitude – 1 to 10 MPa
- Short time duration – 1 μs to 20 μs
- Rapid pressure increase – < 100 ns
- Broad frequency spectrum – 1 Hz to 1 MHz

For therapeutical application, these values are lower, especially the maximum pressure amplitude, which is about 15 MPa, pulse length is 10 to 20 μs, and frequency of the applied shockwave is 1 to 25Hz. The treatment is generally carried out without local anaesthetic and lasts about 15 to 30 minutes. During the first week after the treatment, the client should avoid all activities that could excessively strain the treated area.

1.3 SHOCKWAVE GENERATION

Several types of generators were developed for the shockwave therapy, providing shockwaves with varied characteristics. Shockwaves in their time span and spatial arrangement carry the imprint of the generation method.

The BTL 5000 SWT uses the ballistic principle of the shockwave generation.

1.3.1 BALLISTIC PRINCIPLE OF THE SHOCKWAVE GENERATION

A pressure wave is formed via a projectile by accelerated compressed air, which is generated by an electronically controlled ballistic-pressure compressor. Using elastic impact, the kinetic energy of the projectile is transferred into a probe of the applicator and into the client's body via this probe. Consequently, during the treatment, the end of the applicator must be in immediate contact with the skin and subcutaneous tissue.

1.4 BIOLOGICAL EFFECTS OF THE SHOCKWAVE

The shockwave effects mainly occur at sites, where there is a change in impedance, such as the bone-soft tissue interface.

There is an improvement of regeneration and repair of tissues in the following areas and achievement of the following effects:

- **cellular effect** – increase in transmittance of a cell membrane (improvement of ionic channels activity), stimulation of cell division, stimulation of cellular cytokines production,
- **reproduction of vessels in the area of tendons and muscles**, improvement of blood circulation and MTB- increase in concentration of growth factor beta 1 – chemotactic and mitogenic effect on osteoblasts,
- **effect on nitrogen oxide system** (bone healing and re-modelling),
- **improvement of micro - circulation and metabolism**,
- **dissolution of calcic fibroblasts,**
- **support of collagen production**,
- **reduction of tissue tension**,
- **analgetic effect**:
  - destruction of afferent nerves and nerve receptors,
  - CNS stimulants, sensed as pain; are also inflammation transmitter substances,
  - regression of pain caused by local ischemia,
  - gate control theory of pain.

1.5 ADVANTAGES OF THE SHOCKWAVE TREATMENT

- by targeted operation of the shockwave, strain of surrounding tissues is quite insignificant
- the body is not strained by pharmaceuticals (except a short term effect of local anaesthesia)
- possibility to prevent from necessity of surgical intervention and relevant hazard
- thanks to ambulatory treatment the absence from work reduces to a minimum, as well as the absence from training routine of sportsmen
- for some indications (e.g. tennis elbow) there is basically no other effective treatment

1.6 POSSIBLE SIDE EFFECTS AFTER THE SHOCKWAVE TREATMENT

- erythema or swelling can temporarily occur in the treated area
- loss of bodily sensation or itching can temporarily occur in the treated area
- momentary increase of pain can appear immediately after the treatment
- haematoma
- petechia
- skin damage after previous corticoid therapy
- shockwave application can cause undesirable heart activity

1.7 INDICATIONS FOR THE SHOCKWAVE TREATMENT

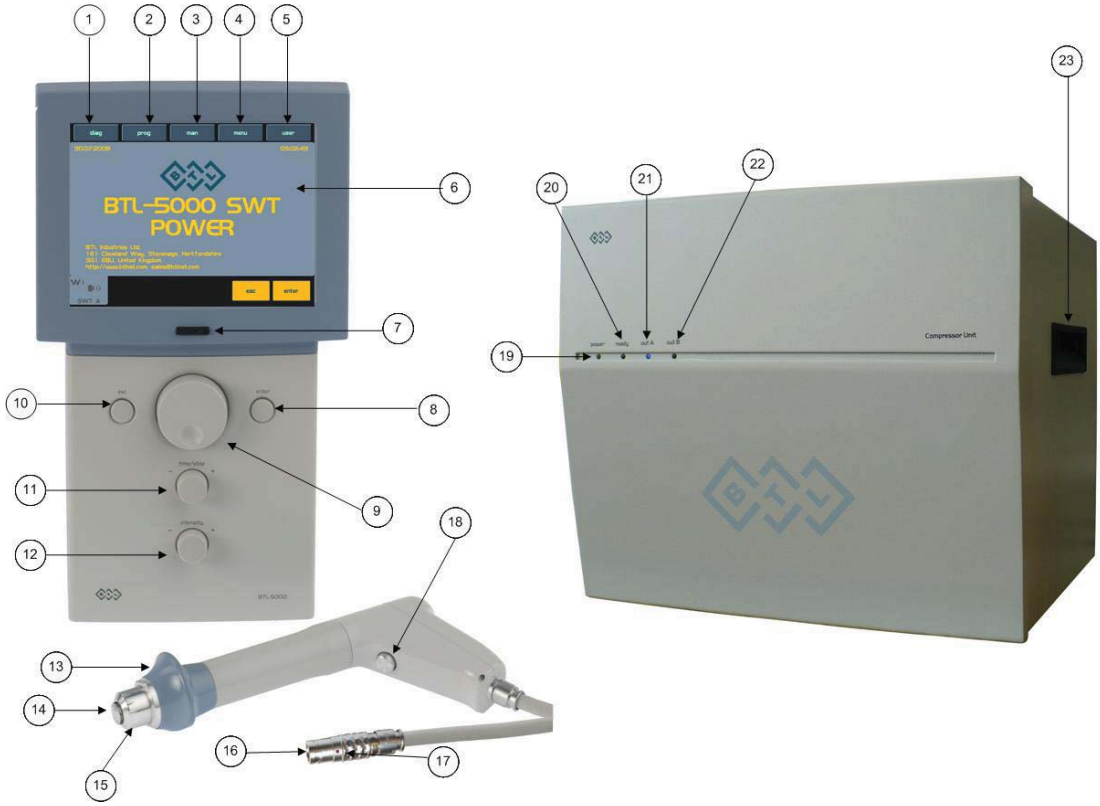
- plantar fasciitis
- achillodynia – achillobursitis
- inflammations and calcification of shoulder joint tendons
- pain in the groin area
- epicondylitis (tennis and golf elbow)
- the apex patellae syndrome and tibial stress syndrome
- pain in the area of the hip and the iliotibial tract
- jumper's knee / patellar tendinitis
- pain in the hamstring insertions
- pain on the palmar side of the wrist
- exostoses of small hand joints in case of grade 1 arthrosis
- acupuncture
- pain trigger points - painful points in muscles

1.8 CONTRAINDICATIONS TO THE SHOCKWAVE TREATMENT

- application to certain tissues (eyes and their surroundings, myocardium, spinal cord, gonad, kidneys, liver)
- coagulation of blood disorders
- polypus in the area of treatment
- pregnancy
- coagulation of blood disorders and the use of anticoagulants
- thrombosis
- tumour disease
- polyneuropathy
- acute inflammation
- growing cartilage in children
- therapy using corticoids
- inapplicable in areas and organs with possible gas content
- inapplicable on areas in proximity to large nerves, vessels, spinal cord and head

2 INSTRUCTIONS FOR USE

2.1 FRONT PANEL OF THE BTL- 5000 SWT



1. **diag** button to select diagnosis
2. **prog** button to select therapy program
3. **man** button to set therapy parameters manually
4. **menu** button (to set date, time, language, display contrast, sounds, user options, etc.)
5. **user** button (lists of clients, user diagnoses, programs and sequences, recent therapies, etc.)
6. touch screen
7. **ON/OFF** power switch (“ON” status indicated by the blue backlight)
8. **enter** key (to confirm selection or setting)
9. **select** knob (to select and set individual parameters)
10. **esc** key (to cancel selection or setting and return to the previous status)
11. **time / stop** knob (to set therapy time, and to start and stop therapy)
12. **intensity** knob (to set intensity)
13. hand rest of the applicator
14. **shock transmitter** of the applicator
15. shock transmitter screw cap of the applicator
16. connector of the applicator
17. guide mark of the connector
18. applicator button for therapy start
19. **power** activation indicator of the compressor
20. indicator signalling - ready to generate shockwaves **ready**
21. active tab indicator for the applicator output **out A**
22. active tab indicator for the applicator output **out B**
23. handles for easy transport of the compressor unit

2.2 REAR PANEL OF THE BTL- 5000 SWT

24. dummy plugs of the connectors
25. mains switch to switch the main unit on/off
26. socket for connection of the mains cable 230 V (or115 V) to the main unit
27. line fuse of the main unit
28. power switch 230V / 115V (bottom part of the main unit)
29. label with serial number and production date
30. com in - communication link input for the main unit (for servicing purposes only)
31. com in / out - communication link connector between the main unit and the compressor
32. type plate - showing device type, manufacturer and safety precautions and warning signs
33. ventilation louver
34. communication link input / output for the compressor unit
35. ON / OFF power switch for the compressor unit
36. socket to connect the mains cable 230 V (or 115 V) to the compressor unit
37. line fuses of the compressor unit
38. power switch 230V / 115V of the compressor unit
39. connectors for the shockwave applicators
40. input for connection of foot pedal
41. communication connectors (for servicing only)
42. catchment container

2.3 ASSEMBLY AND PUTTING INTO OPERATION

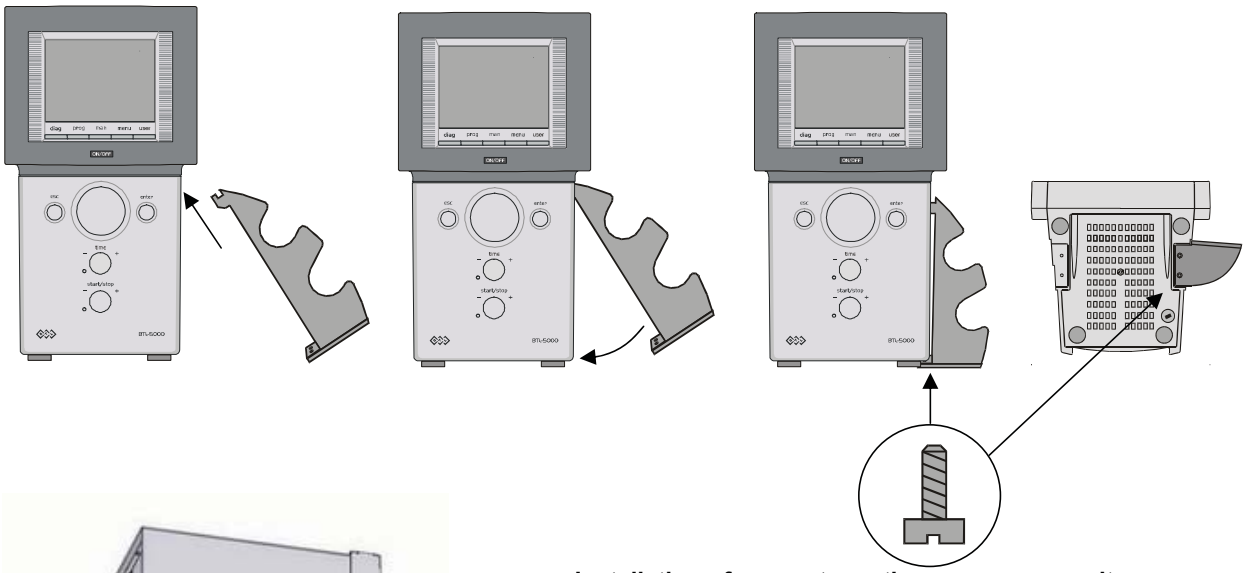
Inspect the package and in case of any damage report it to the delivery service or your distributor. Do not proceed with installation or assembly if the package is damaged.

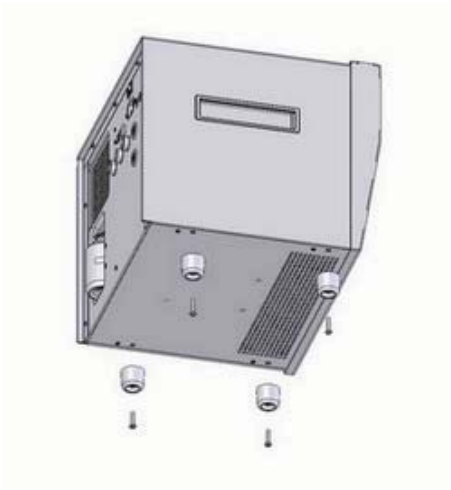
Unpack the device and place it on a stable horizontal surface suitable for the weight of the device. Always position the unit out of direct sunlight. The device heats up therefore it must be placed away from a direct heat sources such as radiators or room heaters. Cooling of the equipment is provided for by forced air circulation. Cooling vents are located on the rear panel and at the bottom of the BTL-5000 SWT and must not be covered. Do not position the device on a soft surface as it may obstruct the air flow to the bottom cooling vents. Do not put any objects producing heat or containing water or other liquid on the top of the device. Do not place the device close to equipment producing strong electromagnetic, electric or magnetic field (diathermy, X-rays, etc.), as the electronic systems of the device could be undesirably influenced. In case of any questions please call your authorised BTL distributor.

Retain the original packaging to ensure the eventual safe transportation of the device.

Attaching the accessory holder:

Remove the protective caps from the holes on a side of the device. Use a screwdriver to gently slide the blade under the cap and take it out. Align the accessory holder and secure it with two screws from below.





Installation of supports on the compressor unit:

The supports are only installed if the compressor unit will not sit on the cart (different legs are supplied with the cart).

The BTL-5000 e-stim SWT package includes compressor unit legs, which prevent the unit from moving during therapy.

Screw the supports according to the following picture.

.

1. Connection of the BTL -5000 SWT main unit with the compressor is accomplished by connecting the communication cable to the input/output of the communication link on the relevant unit. Plug the communication cable into the link connector on the main unit (**31**) and into the link connector (**34**) on the unit of the compressor.

2. At first connect the shockwave compressor to the socket and then the main unit of the BTL -5000 SWT device.

Plug the device directly into the mains socket. Do not use any multi-connection extension cables or adapters.

Check the correct mains voltage - 230 V (or 115 V)

Before the first connection of the device to the mains, it is necessary to check if both the mains voltage switches (**26** and **28**) are in the position corresponding to local voltage standards, (either in the position 230V or 115V). For details, see the note "Switching the device to different mains voltage" in the chapter **MAINTENANCE AND SAFETY INSTRUCTIONS**. In case of any questions please call your BTL distributor.

3. Connect the supplied accessories step by step to the **output connectors** (**39**) on the rear panel of the shockwave compressor as follows (item No. 3 on the picture):

Turn the connector of the applicator so the red spot on its end is in direct line with the red spot on the output connector of the shockwave compressor and then plug the connector in.

WHEN DISCONNECTING THE CONNECTOR, hold the grooved end part of the applicator of the connector with your fingers, slowly pull the connector towards you and disconnect it carefully.

WARNING!!! DO NOT TURN THE WHOLE CONNECTED CONNECTOR BY FORCE, AS IT CAN DAMAGE THE DEVICE!!!

The device detects the accessories, specifies the type and displays it on the screen in the appropriate tab. In the case of connecting improper accessories by mistake, a warning and help will display on the screen with instructions where to connect the appropriate accessories.

4. Activate the ON / OFF power switch of the compressor unit (**35**).

5. Then turn the power supply switch to switch the main unit ON/ OFF (**25**)

6. Press the ON /OFF switch placed on the front panel of the main unit (**7**)

Note:

After switching on, the device will test all its internal circuits and functions (about 10 - 15 secs) and in the case of any fault the system will signalize it and 'lock' itself into a secure mode. If this situation occurs, please call your authorised BTL distributor.

2.4 OPERATING THE DEVICE

2.4.1 TOUCH SCREEN

The touch screen can display several graphic items, some of them are only informative, some can be pressed and thereby activated. See the following basic items:

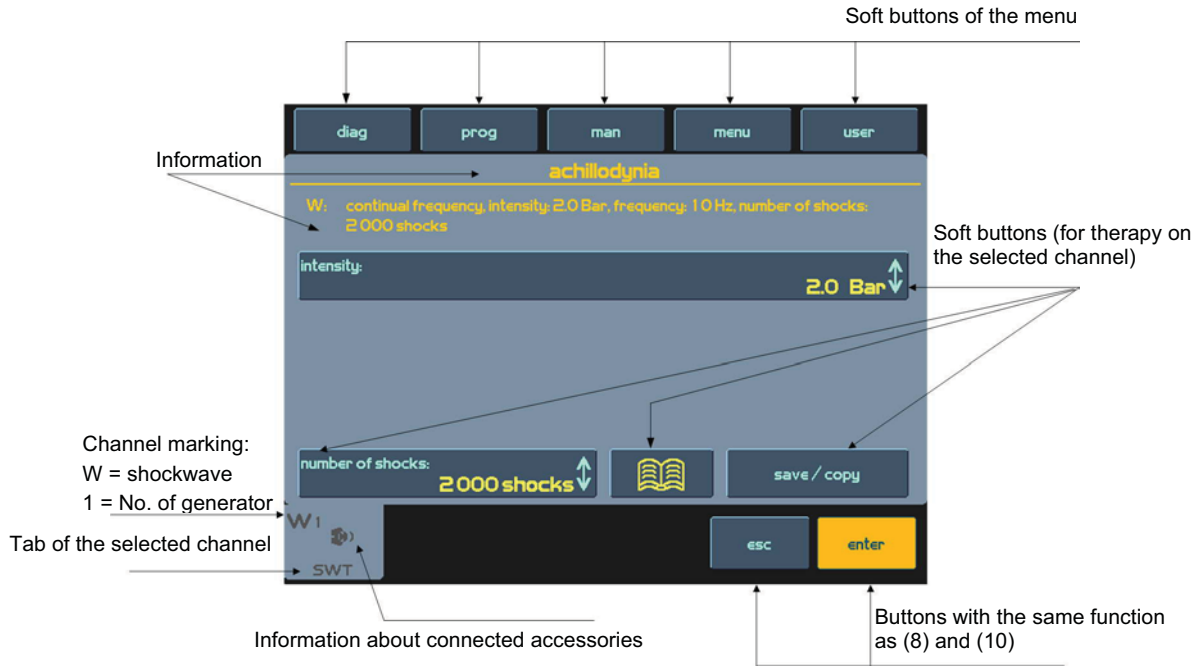
- soft buttons (can be pressed to change the indicated values)
- informative text
- channels tabs (switching between the channels and selection)

The items on the touch screen can be pressed by a finger or by using a special pointer with a soft tip, so - called touch- pen, which is included in the accessories of the device. The touch screen must not come in contact with any sharp objects, ball pens etc.

Selected channel

The BTL -5000 SWT Series allows the connection of up to two applicators, but only one can be active. Only one so-called "selected channel" can be operated at a time. The selected channel has a light tab. All information on the screen and all control elements relate to this channel. The most important information about therapies on the other channels can be viewed on their tabs.

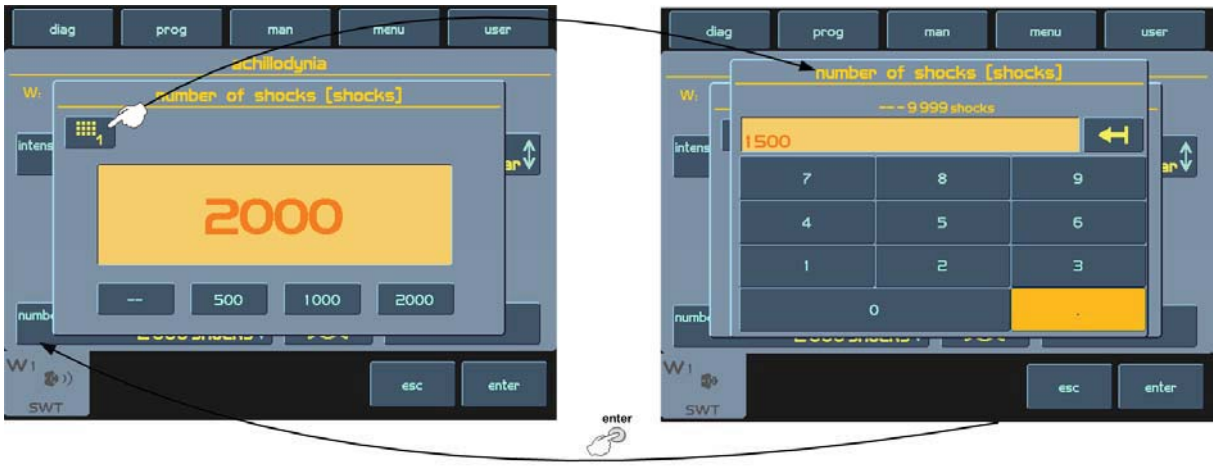
The BTL 5000 SWT does not allow the use of two applicators at the same time. Each applicator can contain a different transmission item, differing in its size. This brings the advantage of applicability for two different therapies without the need to change the transmission elements.



2.4.2 NUMERIC KEYPAD

In addition to setting the numerical values with the **select** knob (**9**) on all the screens, you can also use the „numeric keypad" for quicker setting.

Icon to open the window with the numeric keypad:

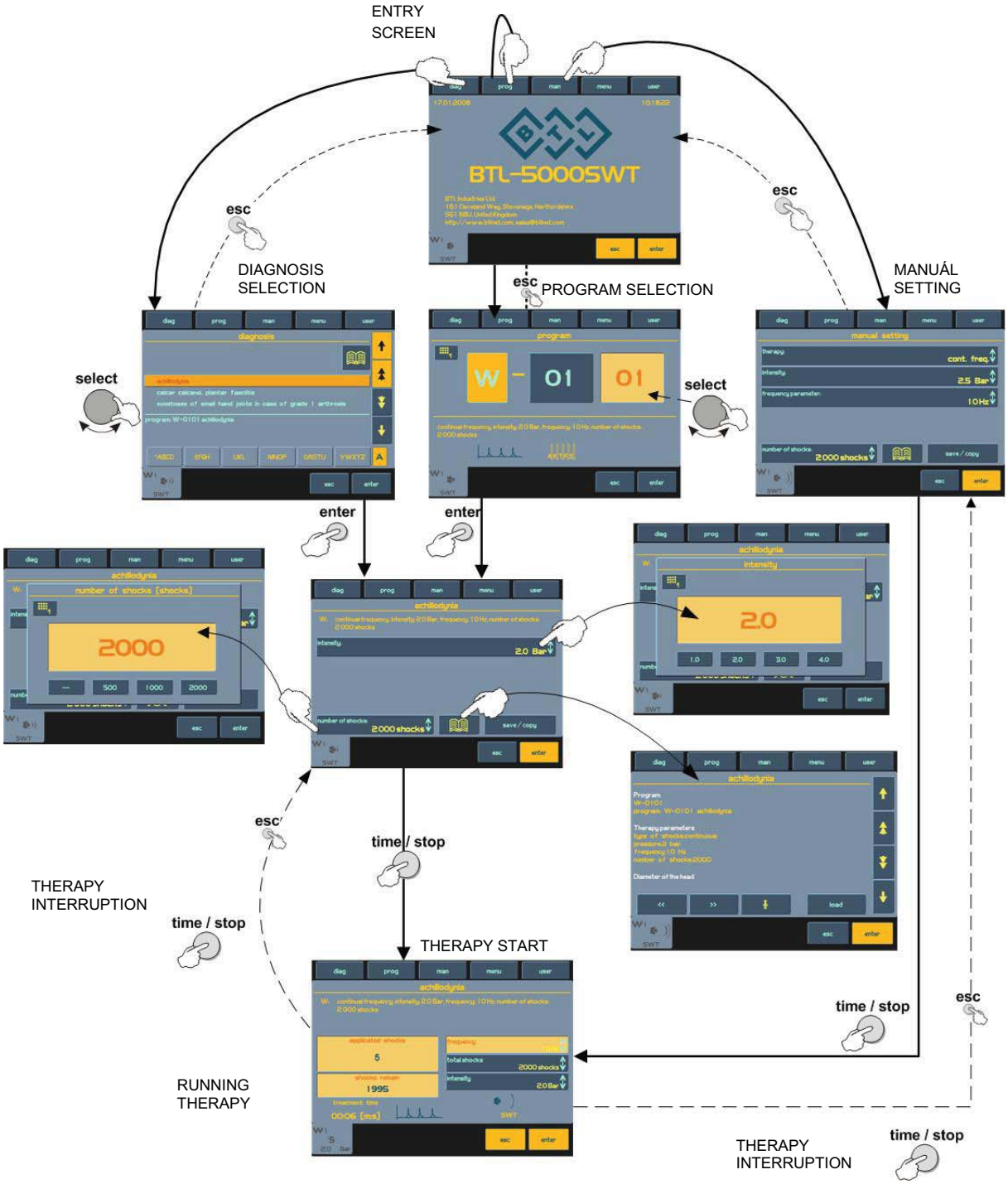


Press the numeric keypad button to display the window with the numeric keypad for the parameter with the light button (on the picture: the button - number of shocks - 2000). Set the required values and return to the previous screen by pressing the **enter** (**8**) button. If you do not want to enter any values or change the selected parameter, leave the window with the numeric keypad by pressing the **esc** (**10**) button.

If you enter a value out of the allowed range of values (stated above the entering box) or the device cannot set it, then the value is rounded to the nearest lower allowed value.

2.5 THERAPY (SETTING PRINCIPLE)

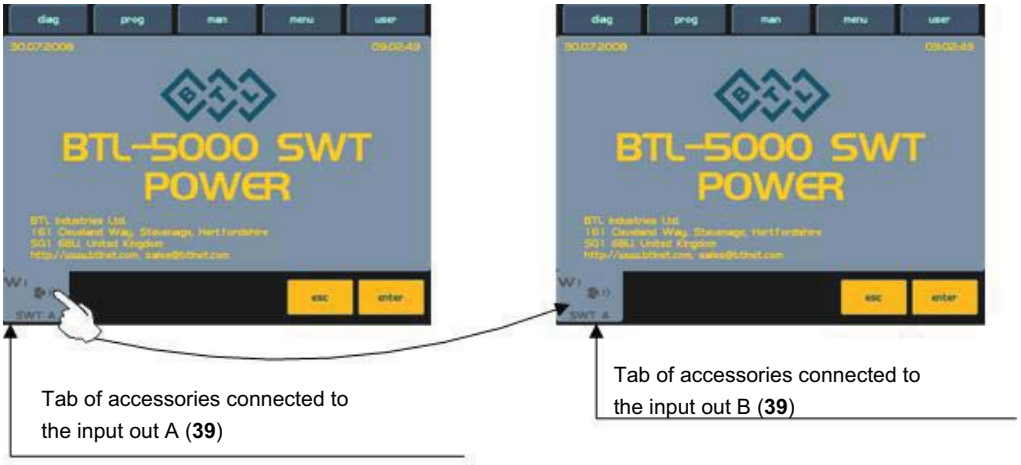
2.5.1 DIAGRAM OF THE THERAPY SETTING PROCESS



2.5.2 WELCOME SCREEN AND SELECTION OF CHANNELS, TABS AND ACCESSORIES

After switching the device ON, the entry screen includes information on the channel tabs with icons of connected accessories. The number of channels - tabs dependents on the required configuration of the device. By pressing the tab, information of the actual channel displays. Information adjusted on the „invisible channels" will definitely remain saved. Almost the full screen is available for the "selected channel" - see the picture.

Switching the channels:



To switch between the connected accessories, press the W1 tab, see the picture. If both shockwave accessories are connected, then the channel W1 displays the tab of accessories connected to the input **out A** (**39**), and by pressing it, information on accessories connected to the input **out B** (**39**) will display.

Examples of information on the tabs:

Tab of channel W1 with no connected accessories

Tab of a selected channel W1, where the **shockwave therapy** can be applied with the connected accessories BTL- 214-1 (**SWT A**)

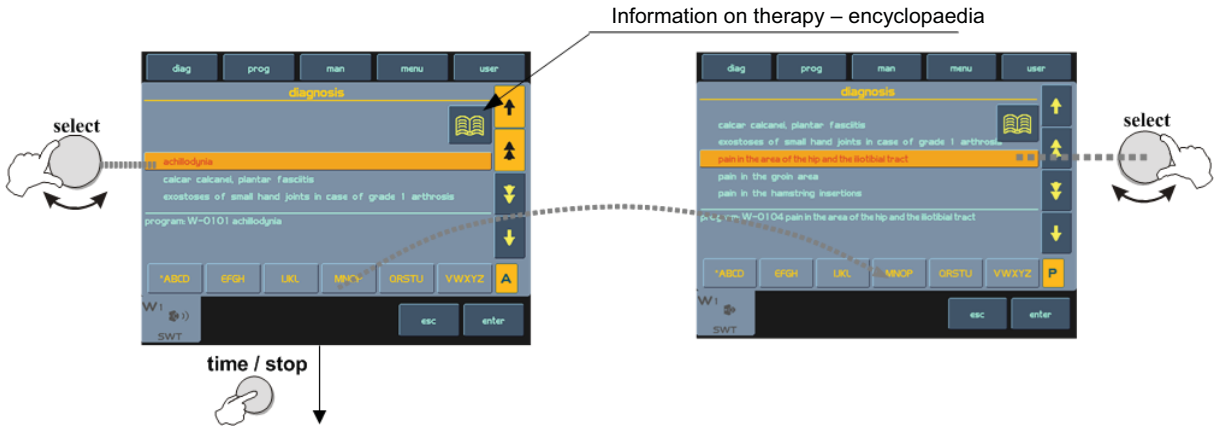
Tab of a selected channel W1, where the **shockwave therapy** can be applied with the connected accessories BTL- 214-1 (**SWT B**)

2.5.3 SETTING THERAPY PARAMETERS VIA THE ‘DIAG’ BUTTON

A list of diagnosis will display after pressing the **diag** (**1**) button. Each tab – channel – has its own assigned list of diagnosis.

A fast search for diagnosis can be done by pressing the buttons with initial letters. For example, press the **MNOP** button once and all diagnosis beginning with the letter M will display. According to of the number of presses, other letters will display e.g. 2 presses of **MNOP** = N, 3 presses = O and 4 presses = P. The actual selected letter is displayed in the box on the right, next to the buttons.

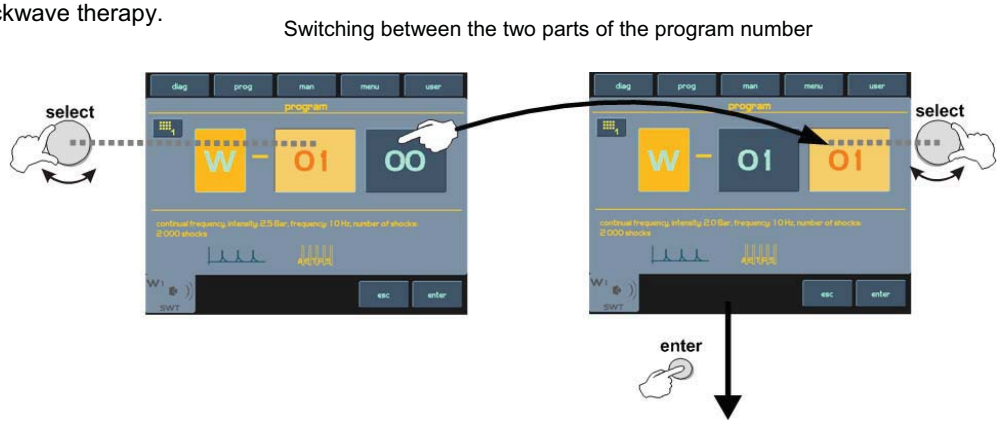
After finding the required diagnosis, select it by pressing the **enter** (**8**) button.



2.5.4 SETTING THERAPY PARAMETERS VIA THE 'PROG' BUTTON

After pressing the **prog** (**2)** button, a screen will display, where a number of the required therapy program can be entered. Numbers of the particular programs include prefix – a letter matching the selected therapy:

W – Shockwave therapy.

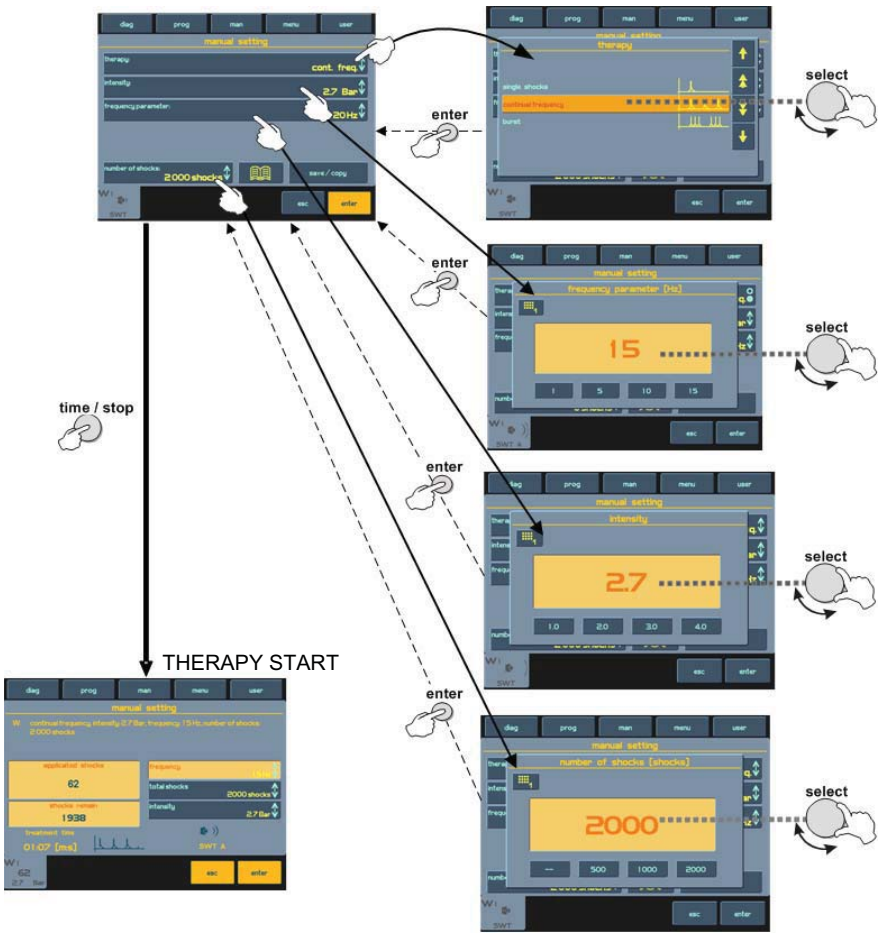


For faster entry of the program number, you can also use the numeric keypad – for more details see the chapter **Numeric keypad**.

2.5.5 SETTING THERAPY PARAMETERS MANUALLY (USER SETUP) VIA THE ‘MAN' BUTTON

The screen of the therapy parameters for the user (manual) setting will display by pressing the **man (3)** button. All specifications of the therapy can be adjusted and possibly saved as the user program or the diagnosis.

By pressing the particular soft buttons, the actual menus and setup dialogs will appear. The majority of dialogs include illustrations and symbols. See the option diagram of individual settings in this mode:



2.5.6 THERAPY PARAMETERS SCREEN – ERGONOMIC, STANDARD AND EXPERT MODE

This screen always opens before the start of therapy, by pressing the **diag** (**1**) or **prog** (**2**) buttons (see **Diagram of the therapy setting process**). The screen either shows the most important parameters of the therapy – you have selected the ergonomic operation mode, or is shows all information on the therapy – you have selected the expert or standard operation mode. In addition, the expert mode can modify all the parameters.

The differences between the modes are apparent from the following pictures:

Ergonomic mode

Standard mode

Expert mode

The operation mode can be set in the menu of the device by pressing **menu (4)** – for more details see the chapter **Operation mode**. The expert operation mode can be entered from any mode by the quick selection – press the **man (3)** button.

2.5.7 SETTING NUMBER OF SHOCKS

The total number of shocks for the therapy can be adjusted on screen of the therapy parameters, even during the therapy course. The number is set either by pressing the button - number of shocks, or quick selection – by turning the **select (9)** knob.

With the button number of shocks you can select "endless therapy" - see the picture

The endless therapy includes an infinite number of shocks, that can be applied at the start of the therapy (end of therapy is not limited by marginal number of shocks).

2.5.8 SETTING THERAPY INTENSITY

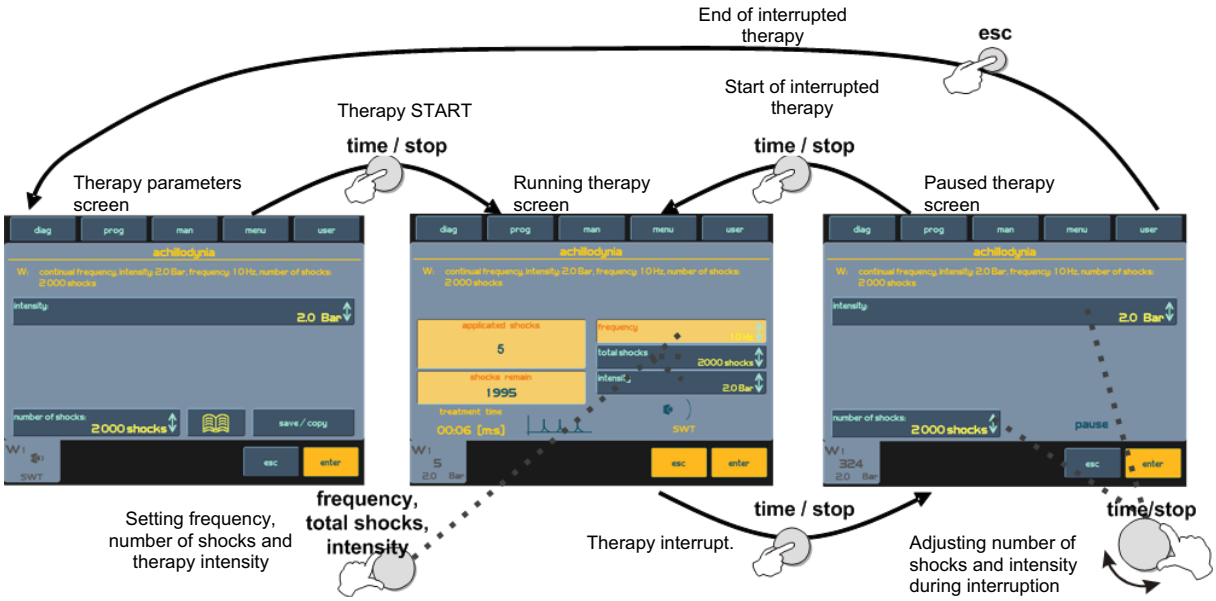
The intensity (power) of the shockwave therapy can be only adjusted on the screen of the therapy parameters, even during the therapy course. The intensity is adjusted either by pressing the **intensity** button or quick selection – by turning the **intensity** (**12**) knob.

To enter the quick mode of intensity setting, press the intensity knob and turn it at the same time – the adjusted intensity changes much faster.

2.6 COURSE OF THERAPY

2.6.1 START - INTERRUPTION - END OF THERAPY

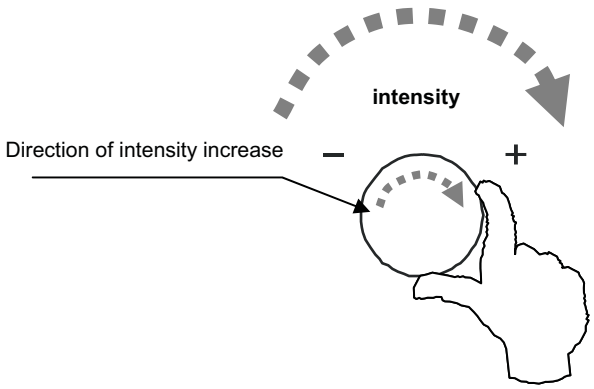
Start the therapy by pressing **time / stop** (**11**). The therapy can start only, if the channel screen displays the therapy parameters and all the parameters are adjusted correctly. The device will signalize possible discrepancies.



Interrupted therapy – paused therapy – can be restarted by pressing the **time / stop** key and can be finished by pressing **esc** (**10**).

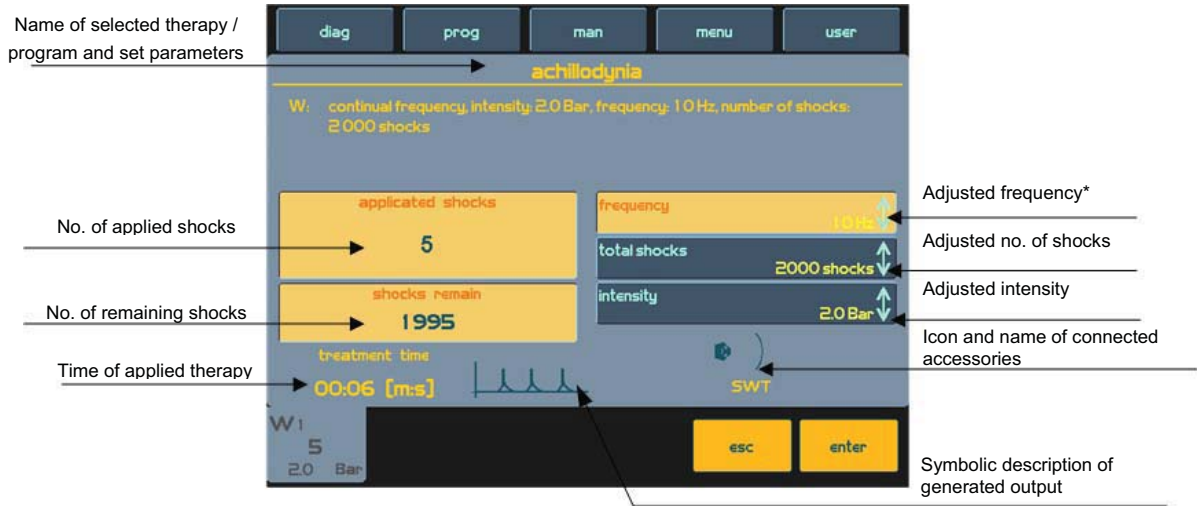
In pause – interrupted therapy – the parameters of intensity and total number of applied shocks can be modified by turning the **time / stop (11)** knob.

The intensity can be also changed during the therapy by turning the **intensity** (**12**) knob to the right – to increase the intensity, or to the left – to decrease the intensity. For a quicker intensity setting, press the **intensity** (**12**) knob while turning. The intensity setting will be much faster when pressing the knob.



The shockwaves therapy can also be started / interrupted by the **button**, located on the shockwave **applicator** (**18**), **or by the foot pedal** (**40**). The initial setup of the button or the pedal is adjusted to **AUTO**. The device automatically recognizes the holdoff time of the button on the applicator, or the foot pedal and the selected method of control. If you hold the button or the foot pedal for more than 1sec, then after its subsequent release the therapy will stop (as in the **continual** mode, see the chapter **APPLICATOR BUTTON MODE / FOOT PEDAL MODE)**. During the time of pressing the button or the foot pedal, generation of shockwaves will be in progress. If the button of the applicator or the foot pedal is pressed for less than 1sec, then after its release the device will be set to the option **ON/OFF** (see the chapter **APPLICATOR BUTTON MODE / FOOT PEDAL MODE**).

2.6.2 RUNNING THERAPY SCREEN



Pressing the **time / stop** (**11**) key can also start and interrupt the therapy – see the chapter **Start - interruption - end of therapy**.

*the maximum frequency value according to the relevant configuration of the device is 15 Hz or 22 Hz (see more in the table in the chapter **Device configuration**).

2.7 THERAPY PARAMETERS

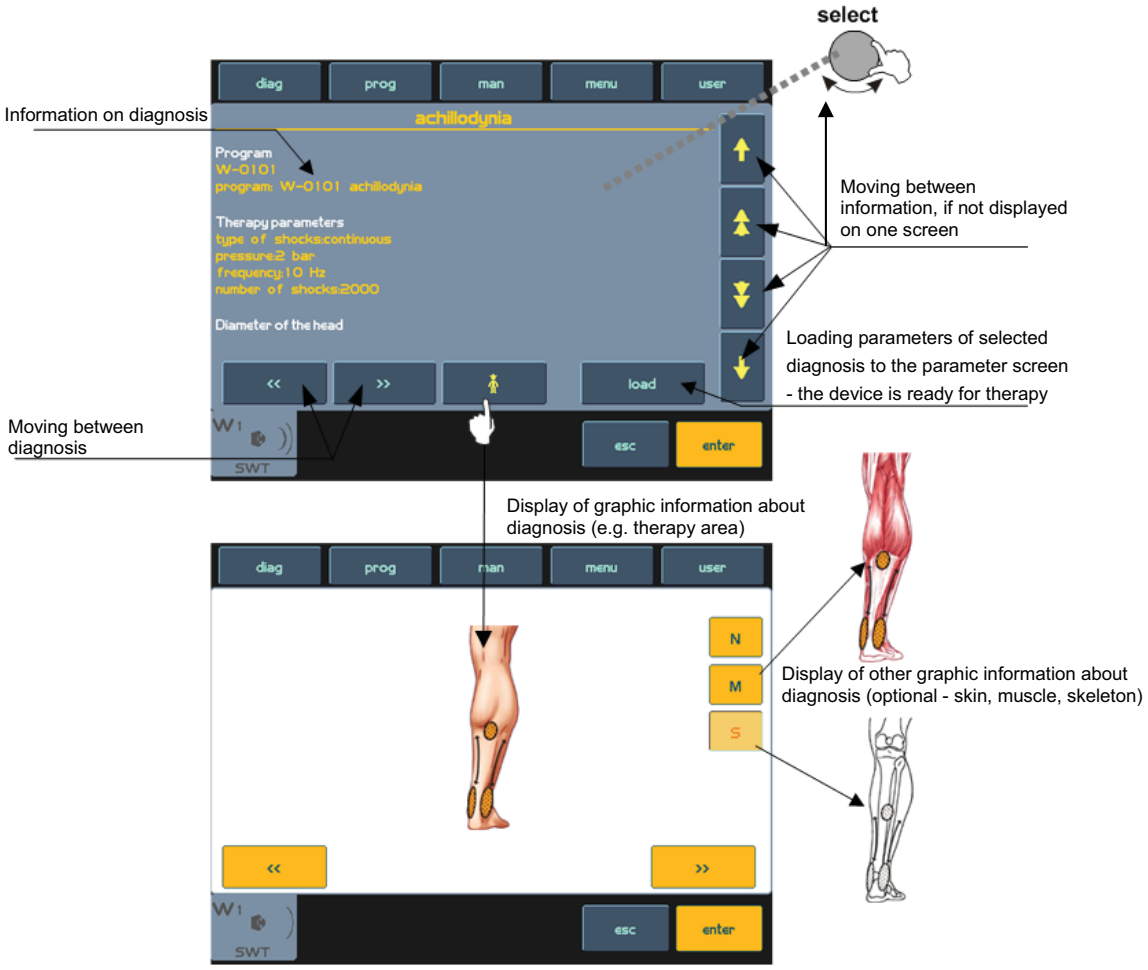
Each therapy can have different parameters. For each therapy, only the parameters that describe that therapy will be displayed and these parameters can be adjusted in the manual mode, after pressing the **man** button. An exact description of the parameters for individual therapies can be found in the relevant **User's manual**.

2.8 ENCYCLOPAEDIA

The encyclopaedia includes information on possible therapies and examples of areas for the shockwave application. The device is always supplied with a hard copy of encyclopaedia. Its electronic format is included in the device, and is available from most screens and menus.

Icon to open the **encyclopaedia**:

If you open the encyclopaedia after a selection of a particular diagnosis, the existent information to the selected diagnosis will be displayed. Otherwise you will enter the contents of the encyclopaedia – the list of particular diagnosis. You can browse through the encyclopaedia by turning **select** (**9).** After the selection of the required diagnosis, you will enter the particular information about the diagnosis by pressing **enter** (**8)**:



2.9 THERAPY SAVING

The user can select a particular operation after pressing the **save** button. Depending on a selected operation, a form with the appropriate data will be revealed. An example of the procedure is displayed on the following screens.

You can save the therapy always after setting the therapy parameters – i. e. from the **screen of therapy parameters** – see the chapter **Therapy parameters screen** - ergonomic, standard and expert mode. The following information is saved for each shockwave therapy:

- Frequency
- Number of shocks
- Intensity

When saving the therapy, enter:

- Name of the diagnosis (therapy) – will be displayed in list of diagnosis under the diag **(1)** button
- Program number – will be displayed between programs under the prog **(2)** button
- Description, additional information – it is displayed in both lists „below the line"

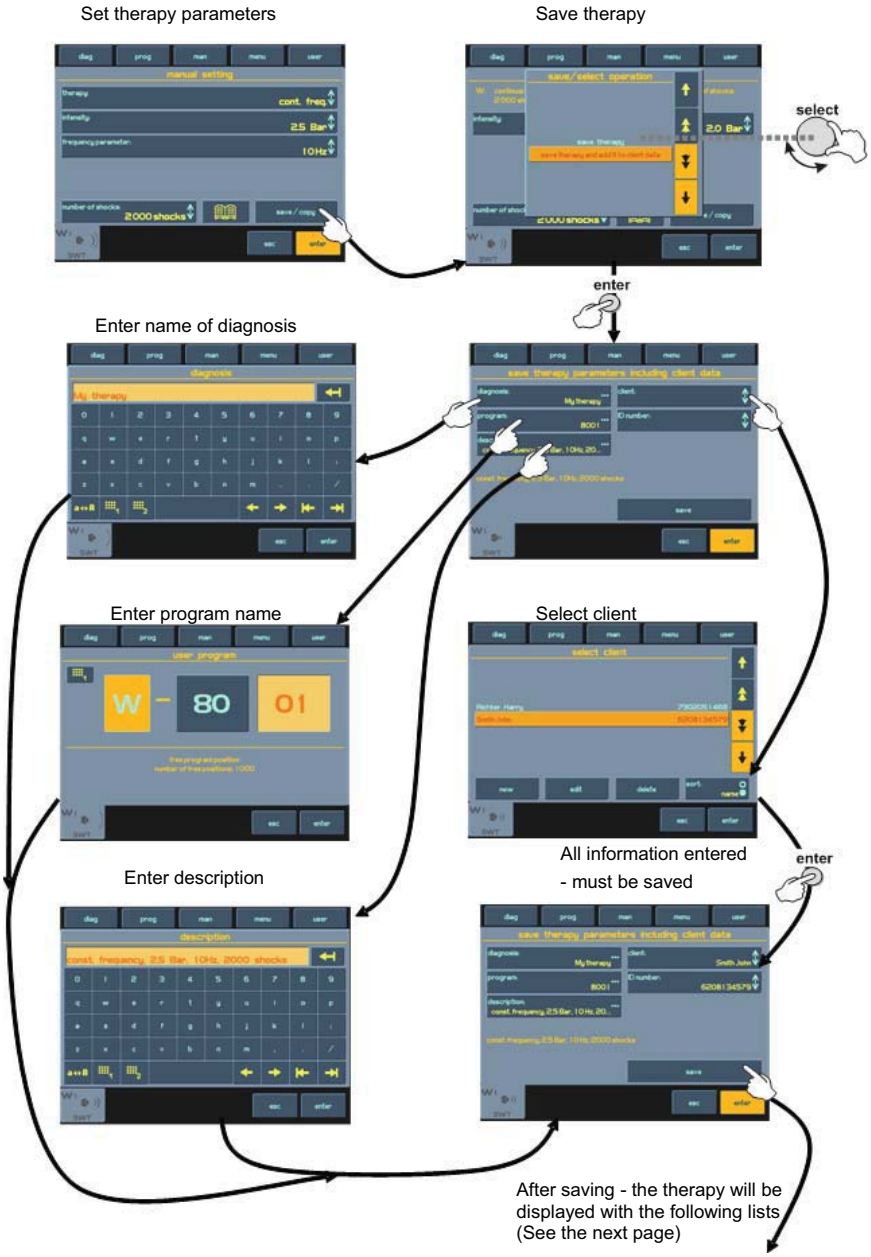
You can choose the number of the saved program from the numbers 8000 to 8999. The device offers you the lowest available number. And during saving it adds a letter of the corresponding compressor belonging to the program. So the resulting number can be e.g.: W- 8001 for the shockwave therapy.

2.9.1 SAVE THERAPY AND ADD IT TO THE CLIENT DATA

All therapy parameters that are saved in this item of the menu are the same as the previous item included in the therapy saving menu. The saved therapy will also appear in both lists – the list of diagnosis and the list of programs.

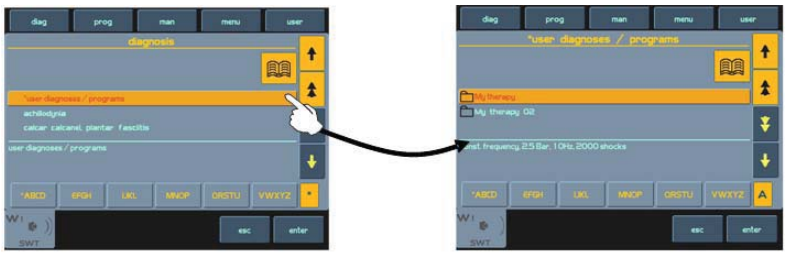
In addition it will also display in the list of therapies assigned to the entered client.

See the following diagram displaying the whole dialog of the therapy saving.



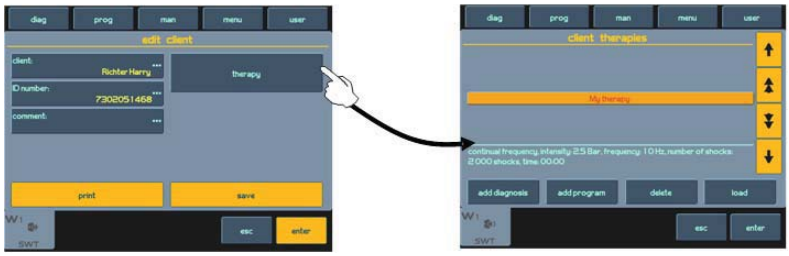
The saved therapy can be found in these lists on the relevant channel:

List of diagnosis



List of programs

List of therapies of the selected client



2.9.2 END OF THERAPY / SHOCK GENERATION

On a regular basis the therapy ends after the application of the adjusted number of shocks. If, for whatever reason, you want to end or interrupt the therapy before finishing the adjusted number of shocks, it is possible to interrupt the therapy by pressing the **time / stop** key or the button on the applicator. To end the therapy press **esc**.

The generation of shocks will finish by expiry of the adjusted number of shocks applied, or it is possible to finish their generation by releasing (in a state of continual mode) / and pressing again the button of the applicator (in a state of ON /OFF mode) see the chapter **Shockwave setting - applicator button mode**.

3 DEVICE MENU

After pressing **menu** (**4)** it is possible to browse the following offers by using the **select** knob:

- Accessories
- Encyclopaedia – see the chapter **Encyclopaedia**
- Unit settings
- Specific settings

3.1 ACCESSORIES

In this submenu you can select:

- Installation of accessories
- Information about connected accessories
- Information about the number of clients and connection of connectors on the rear panel of the device

3.1.1 INSTALLATION OF ACCESSORIES

Each connected accessory has the memory that includes identification data of the actual accessory. According to this data, the device recognizes which accessory is connected, if it is compatible or not, and if the device can work with the connected accessory or not. The memory also contains a serial number of the accessory.

As the memory contains a lot of information and its downloading lasts from 30 seconds to 2 minutes, there is an installation of accessories provided for faster work of the device. After the installation, only the serial number of the accessory is downloaded from the accessory memory and the other information is read from the device memory.

During the installation process, follow the instructions on the screen. In particular:

- During the installation switch off therapies on all the compressors of the device
- Do not have other accessories connected than the one that is being installed (and connect it directly, not via interface cables)

These guides are necessary for decrease of electromagnetic interference that could cause improper downloading of the memory data.

3.1.2 INFORMATION ABOUT ACCESSORIES

This item of the menu displays the information about connected accessories such as Name of the accessory, its serial number etc. And mainly it displays for which generator – output / input – the accessory has been intended and the number of already applied shocks.

3.1.3 INFORMATION ABOUT CONNECTORS

In the BTL - 5000 SWT, this item of the menu only includes the specification of blind / connected connectors on the rear panel of the main unit.

3.2 UNIT SETTINGS

This submenu offers the options of setting and displaying these parameters:

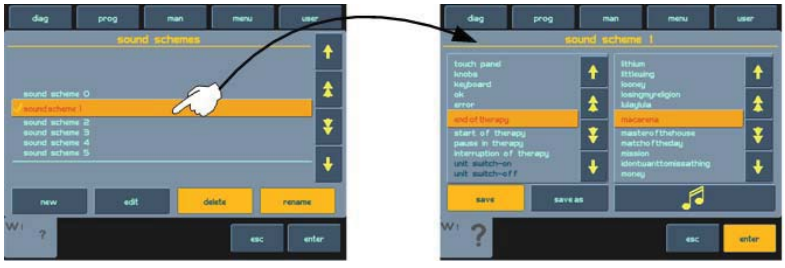
- Password setting
- Sound setting
- Screen saver and auto switch-off
- Colour setting
- Setting of display contrast
- Date and time setting
- Language setting
- Operation mode
- Touch panel calibration
- User options
- Style of operation
- Setting of HW key
- Unit information
- Unlocking code
- Service functions

3.2.1 PASSWORD SETTING

This menu can change the code - password demanded by the device when it is switched on. There is no further work with the device possible, without entering this password. As standard, the device is supplied „unlocked" – with the password switched off.

3.2.2 SOUND SETTING

This includes acoustic signalling of the pressed buttons, touch panel, etc. and accomplishment of certain operations (therapy start, therapy interruption, end of therapy etc.). The device includes **standard sounding** as set from the manufacturer, i.e. signalling the therapy operations. All audio tones can be switched off (**without tones**) or modified as required.



This item can edit individual audio schemes, create new ones and modify audio tones for each operation separately.

The sound volume can be sets in the menu item **User options.**

3.2.3 SCREEN SAVER AND AUTO SWITCH-OFF

This includes the setup of the screen saver type, activation time of the screen saver, period of time during which the screen should be switched off and idle time of the whole device.

3.2.4 COLOUR SETTING

The user can set colours of all elements displayed on the screen. There are 50 preset colour schemes available to choose from, or, if not satisfied with any of them, the user can create and save his/her own colour schemes. In the custom colour scheme, the user can step by step select individual elements.

3.2.5 SETTING OF DISPLAY CONTRAST

After selecting this offer, the optimum contrast (readability) of the display can be set by turning the **select** (**9)** knob.

As the contrast of the screen depends on various factors, (such as temperature), there is a fast and direct setting of the screen contrast, by using the **select (9)** knob while simultaneously holding the **enter** (**8**) and **esc** (**10**) keys.

3.2.6 DATE AND TIME SETTING

This allows the user to set the date and time in the device.

3.2.7 LANGUAGE SETTING

Preferred language of the texts displayed in the device. As standard, English is preset by the manufacturer.

3.2.8 OPERATION MODE

Select one of the three modes, see the chapter **Therapy Parameters Screen – Ergonomic, Standard and Expert Mode**. The ergonomic mode is preset by the manufacturer as standard.

3.2.9 TOUCH PANEL CALIBRATION

If the buttons on the touch screen do not react when pressed, the touch screen needs calibration. The calibration procedure is apparent from the screen of the device. It is advisable to use the touch- pen during calibration and follow the instructions, displayed on the screen of the device.

Unsuccessful calibration can always be interrupted by pressing the **esc** button.

To verify the touch screen adjustments, use the "touch panel function test" feature.

3.2.10 USER OPTIONS

Here, you can set:

- Direction of movement in the menu when turning the **select** (**9)** knob
- Alphabetical order of diagnosis and certain menus (from A to Z / from Z to A)
- Position of the tab bar (up / down)
- Sound volume

3.2.11 STYLE OF OPERATION

- **NEW STYLE OF OPERATION**

Use this option for main units of the first series (manufactured in 2001 and start of 2002). These devices have the knobs (**11**) and (**12**) marked as **time** (**11**) and **start / stop** (**12**). It is necessary for these devices to select the option **new style of operation** = **no** after download of the new version of firmware.

New units are preset by the manufacturer to a new operation mode (**new style of operation** = **yes)**.

- **END OF THERAPY – SETTING ZERO INTENSITY / TIME**

After the end of the therapy you can choose, if you want to leave the adjusted data of time and intensity on the screen in zero values, or display the values of the last performed therapy.

- **REPEAT SOUND FOR END**

This item can switch on / off the function of repeated warning tone of the therapy end.

3.2.12 SETTING OF HW KEY

The device can be remotely configured. For example, if you later decide to purchase the upgrade, the manufacturer (distributor) will send you 64 -digit code (so - called **HW key**) that you will enter and the device will reconfigure its hardware according to the entered key. For the actual HW configuration see the chapter **Unit information.**

3.2.13 UNIT INFORMATION

This item shows certain information about the device – serial number, device type, firmware version, etc. It also contains the information up to when the device will operate – so called "device validity". If the operation of the device is time limited, this item indicates until which date the device stays fully functional.

3.2.14 UNLOCK CODE

If the operation of the device is time limited, then in this item you can enter the so-called "unlocking code" for cancellation of the operational time limitation of the device.

3.2.15 SERVICE FUNCTIONS

- **REPAIR OF FILES**

This checks the file system in the device - system of saved information and repairs possible errors - deletes empty files, etc. We recommend using this feature in the case of lack of memory, if the device rejects to save any data, or if you are in doubt that some data may have been lost, etc.

- **FILE SYSTEM FORMATTING**

If the feature **repair of damaged files** did not help you, select this function. Unfortunately, together with this formatting you will loose all the user data and user setup of the device.

- **DELETE ACCESSORIES**

This item will delete all the installed accessories – use it, when you install the accessories incorrectly – e.g. bad „scattered" picture on the tab, the connected accessories cannot be detected (permanently displayed **question mark**) etc.

- **DEFAULT SETTING WITHOUT LOSS OF USER DATA**

Restoration of all functions of the device the way they were preset by the manufacturer. User data – clients, therapies etc. will stay saved.

3.3 SPECIFIC SETTINGS

3.3.1 SHOCKWAVE SETTING

- **COMPRESSOR MODE**

It adjusts two different types of the mode of pressure control in the system: - quick start

- silent mode

When using **quick start**, the pressure control in the system is activated during switching the device on, therefore the therapy start is instantaneous. We recommend using this setting especially during frequent operations. The disadvantage of this mode is a higher noise level of the device.

In **silent mode** the pressure control in the system is activated only immediately before the start of therapy - during entry to the manual screen of the main unit and after leaving, the pressure stops being kept in the system. That eliminates the noise of the device, if not in use. The disadvantage can be the prolonged start of the therapy – according to pressure in the system the start can be extended for about 10 to 15 seconds. We recommend using this setting for quieter operations.

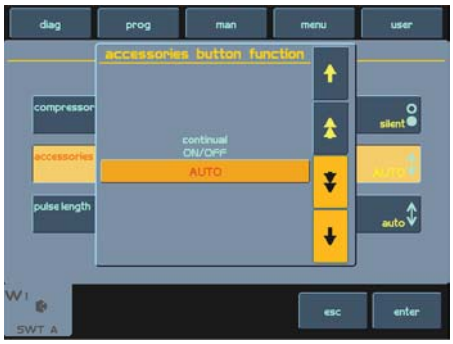
- **THERAPY CONTROL**

Here, you can set whether you want the therapy to be controlled by the button on the applicator (**18**) or using the foot pedal connected to the unit of the compressor (**40**). After selecting the type of therapy control, you can continue by setting the options of the applicator button mode, or the foot pedal mode (see the following chapter).

- **APPLICATOR BUTON MODE / FOOT PEDAL MODE**

This enables setting of the three different types of modes for the applicator button, or the foot pedal (according to setting in the previous chapter). You can choose from:

- AUTO mode
- Continual mode
- ON/OFF mode



When setting the **AUTO mode** the device automatically recognizes the holdoff time of the button on the applicator (**18**), or pressing the foot pedal (**40**) and the selected way of control. If you hold the button or the foot pedal for more than 1sec, then after its subsequent release the therapy will stop (as in the **continual mode**, see below). During the time of pressing the button, or the foot pedal, generation of shockwaves will be in progress.

If the button of the applicator, or the foot pedal is pressed for less than 1sec, then after its release the device will be set to the option **ON/OFF** (see below).

By selecting the **continual mode** you will set the generation of the adjusted shockwaves by only one press of the button on the shockwave applicator (**18**), or the foot pedal (**40**), to end the generation of shockwaves, another touch of the button on the applicator is necessary, or pressing the pedal.

During activated option of the **ON/OFF mode** it is necessary to hold the button of the applicator (**18**), or the foot pedal (**40**) pressed throughout the time of the application of shockwaves. Releasing the button or the pedal stops the generation of the shockwaves.

The setting is saved separately for the button of the applicator and for the foot pedal.

3.3.2 APPLICATOR KIT REPLACEMENT WIZARD

If, after a certain time, the applicator stops generating shockwaves correctly, it is possible to change the applicator kit, following the chapter **Procedure of worn-out tube and roller replacement**. Install this replaced kit according to the displayed instructions.

Procedure of the applicator kit replacement on the device:

1. Connect the original applicator to the compressor.
2. Start the applicator kit replacement guide.
3. Now, disconnect the original applicator from the compressor and complete the replacement of the kit (see the chapter **Procedure of worn-out tube and roller replacement)**
4. After completion of the kit replacement connect the applicator back to the same channel of the compressor unit.
5. Finish the guide.
6. The device has successfully installed the replaced kit.

4 USER OPTIONS

Pressing the **user** (**5)** button will display the menu with items referring to the data saved by the user or referring to certain „special" functions of the shockwave generator:

- Clients
- User sequences
- User diagnoses / programs
- Recent therapies

4.1 CLIENTS

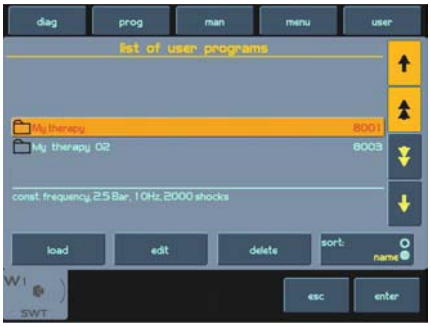
This item allows you to enter, edit and delete information about the clients. A particular therapy can be assigned to each client.

4.2 USER SEQUENCES

This feature - user sequences - is not active for the BTL- 5000 SWT Series.

4.3 USER DIAGNOSES/PROGRAMS

It is possible to start the user therapies, adjust their parameters, names and descriptions, delete them and sort them by using the buttons and offers on the screen. It is very similar to the creation of a new diagnosis / program – see the chapter **Therapy saving.** On the tab of the compressor you can only see those therapies that were created and belong to this tab.



4.4 LIST OF RECENT THERAPIES

This feature allows you to choose one of the recent accomplished therapies on the selected tab and after pressing the **load** button you can restart it and view its parameters.

5 APPLICATION OF SHOCKWAVES

Application of shockwaves is provided by a spring-loaded applicator, which:

- Provides proper and exactly specified contact of the applicator with the treated tissue during the therapy
- Minimizes transmission of reverse shocks to the hand of the therapist thanks to an inbuilt air damper

The component part of the applicator is an ergonomic hand rest (**13**) used for a comfortable grip of the applicator and prevents unwanted slipping of the hand from the holder of the applicator during the therapy. The ergonomic hand rest spins and can be any time adjusted into the desired position.

The anatomical shape of the handle allows the therapist to grip the holder of the applicator comfortably in different positions, exactly according to the type of the applied therapy and personal preferences of the therapist (left-handed person, right-handed person, man, woman).

The ergonomic shape of the handle offers the therapist sufficient support during the application, thereby preventing from the development of tiredness of the hand during the therapy.

Examples of holding the shockwave applicator

Examples illustrate the application of shockwaves in different places and various of ways of holding the applicator.

Painful shoulder

Trigger points

Tibial edge syndrome

Calcar calcanei (plantar fasciitis)

Epicondylitis

Achyllodinia

Patellar tendinopathy (jumper's knee)

Trigger points

6 ACCESSORIES

The device is not designed for use in connection with different accessories and other medical equipment except those stated in this manual.

The following list includes a summary of all accessories that can be supplied with the device.

For detailed information on individual accessories see the enclosed leaflet.

Standard BTL accessories:

- 1x trolley for the BTL- 5000 SWT
- 1x shockwave applicator with multi-focus shock transmitter Ø 15mm
- 1x replaceable multi-focus shock transmitter Ø 9m
- 1x replaceable focusing shock transmitter Ø 15mm
- 1x exchangeable kit (includes a spare set of O-rings)
- 1x applicator holder
- 1x gel 1000 ml
- 1x power cord
- 1x communication cable
- 4x silent blocks for compressor unit
- 1x spare fuse T1.6A/250V for the main unit
- 2x spare fuse T6.3A/250V for the compressor unit
- 1x pen for the for touch screen
- 1x CD with the user's manual
- 2x dust cover of the main unit
- markers for output cables

Optional BTL accessories:

- transport case for the BTL- 5000 SWT
- additional shockwave applicator with focusing shock transmitter
- foot pedal
- gel 300 ml

7 MAINTENANCE AND SAFETY INSTRUCTIONS

Service inspection and measuring of all parameters of the device and relevant recalibration must be executed at intervals shorter than 30 calendar months. The inspection is carried out by authorised BTL customer service on the basis user's order. The manufacturer does not guarantee for the technical parameters and safe operation of the product, if the inspection is not executed on the defined schedule.

Keep the device clean, do not store or use it for a long time in extremely dusty environments and do not spill any liquid onto the surface. Before using check the device and its accessories (especially cables) for mechanical or other damages. Do not use the device if damaged!

Cleaning the surface of the device and its parts:

Clean the BTL - 5000 SWT and its parts only with a lightly damp soft cloth. Use water or a 2 % detergent solution. Never use agents containing alcohol, ammonia, petrol, thinners, etc. To clean the device, do not use abrasive materials as they could damage the surface of the device and e.g. deteriorate metal parts of the applicator. There are no aseptic parts of the device and there is no need to sterilize them.

Cleaning accessories getting in contact with the client (e.g. shock transmitters):

Cleanse after each client using agents approved by the competent health officer. You can use e.g. Sekusept, Bacilol and other. For the cables of the accessories you can use e.g. Incidur spray etc. Surface of the shock transmitter with the cap can be washed with warm water, however for the complete removal of gel from the shock transmitter it is necessary to unscrew the shock transmitter and clean it.

Fuse replacement

The fuse of the main unit is set on the rear panel in a round black box (**27**). Fuses of the shockwave compressor are placed on the rear panel of the unit in a round black box (**37**). Check the accuracy of the inserted fuses during their replacement. The main unit (**25**) and the shockwave compressor (**35**) both use different types of fuses!

Before replacement, first make sure that the mains switches of the main unit (**25**) and the shockwave compressor (**35**) are in „**0"** position and disconnect the power cords from both units. Use a suitable screwdriver or a coin to turn the segment of the fuse case to the left and remove the fuse. Insert a new fuse and finish the replacement similar way, but turn it to the right. **It is prohibited to insert a fuse with different indication, than mentioned on the sign above the fuse box.**

This operation can be accomplished only by a person familiarized with this procedure!

Switching the device to different mains voltage

The witch of the main unit (**28**) is placed under the device in a round black box. The switch of the shockwave compressor (**38**) is placed on the rear panel of the unit. Before switching over, firstly make sure that the power switches (**25, 35**) are in the „**0"** position and disconnect the power cords from the device. Use a suitable screwdriver or a coin to turn the segment of the switches so sign on the switch with the arrow pointing to, correspond to the voltage of the local mains distribution system.

This operation can be accomplished only by person familiarized with this procedure!

If in doubt contact the authorised BTL customer service. The manufacturer is not responsible for any damage incurred by incorrect switchover.

Transport and storage

We recommend retaining the original packaging of the device to ensure its maximum protection during transportation. Disconnect the mains cables and the accessories cables. Avoid heavy shocks. The device must be stored or transported under the conditions defined in the chapter **Technical parameters**.

7.1.1 SHOCK TRANSMITTER REPLACEMENT PROCEDURE

The shock transmitter (**14**) can be replaced by another one as necessary; three shock transmitters are the part of the BTL - 5000 SWT standard accessories:

- 1x replaceable multi-focus shock transmitter Ø 15mm
- 1x replaceable multi-focus shock transmitter Ø 9mm
- 1x replaceable focusing shock transmitter Ø 15mm

Replacement procedure:

1. Unscrew the screw cap of the shock transmitter by hand (**15**).

2. Remove the shock transmitter from the applicator (**14**) (including both O - rings).

3. Insert the selected shock transmitter „as it is" to the applicator (including the mounted O - rings).

4. Put the shock transmitter's screw cap of the applicator back on and screw it tightly by hand (**15**).

7.1.2 PROCEDURE OF WORN-OUT TUBE AND PROJECTILE REPLACEMENT

If the applicator stops working correctly after a certain time, it is possible to change the worn-out system of tube and projectile by using the exchangeable kit that is part of the BTL - 5000 SWT package.

Do not use damaged applicators; otherwise you may cause risk of injury to the operating staff or the client.

The packaging of the spare kit includes:

- 1x exchangeable kit
- 1x key to unscrew / screw the cartridge screw cap
- 1x plastic covering of the exchangeable kit
- 1x set of spare O-rings

Replacement procedure:

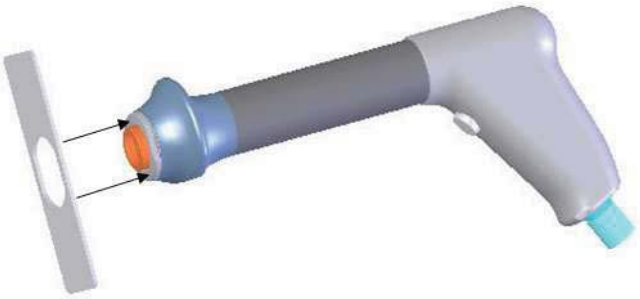
1. Firstly, according to the chapter **Applicator kit replacement wizard** start guide of the kit replacement.

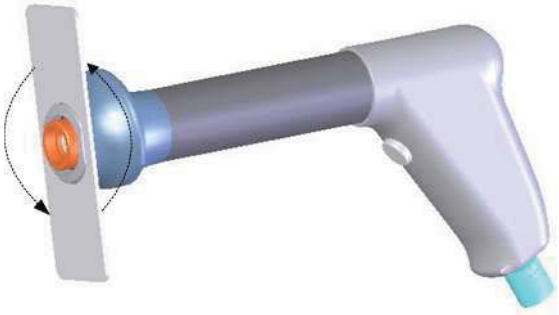
2. Unscrew the screw cap of the shock transmitter by hand (**15**).

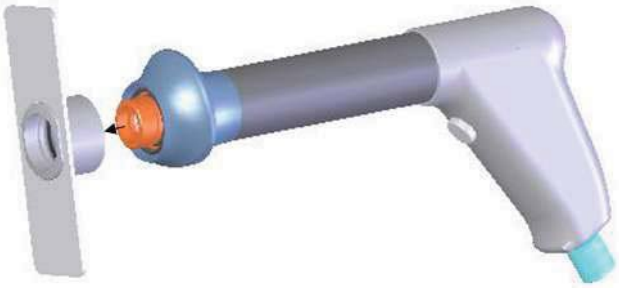
3. Remove the shock transmitter from the applicator (**14**) (including both O - rings).

O-rings

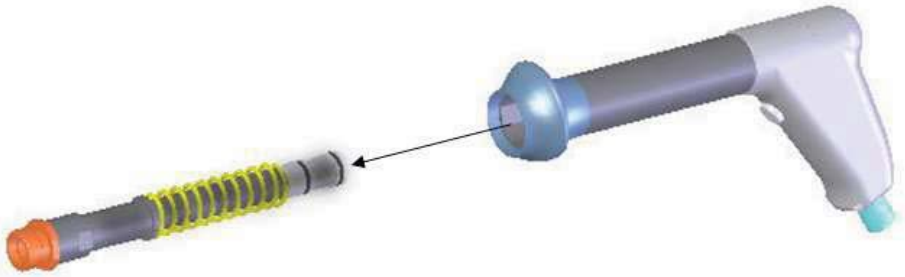
4. Using the key (part of the packaging) unscrew the screw cap of the cartridge, follow the pictures.







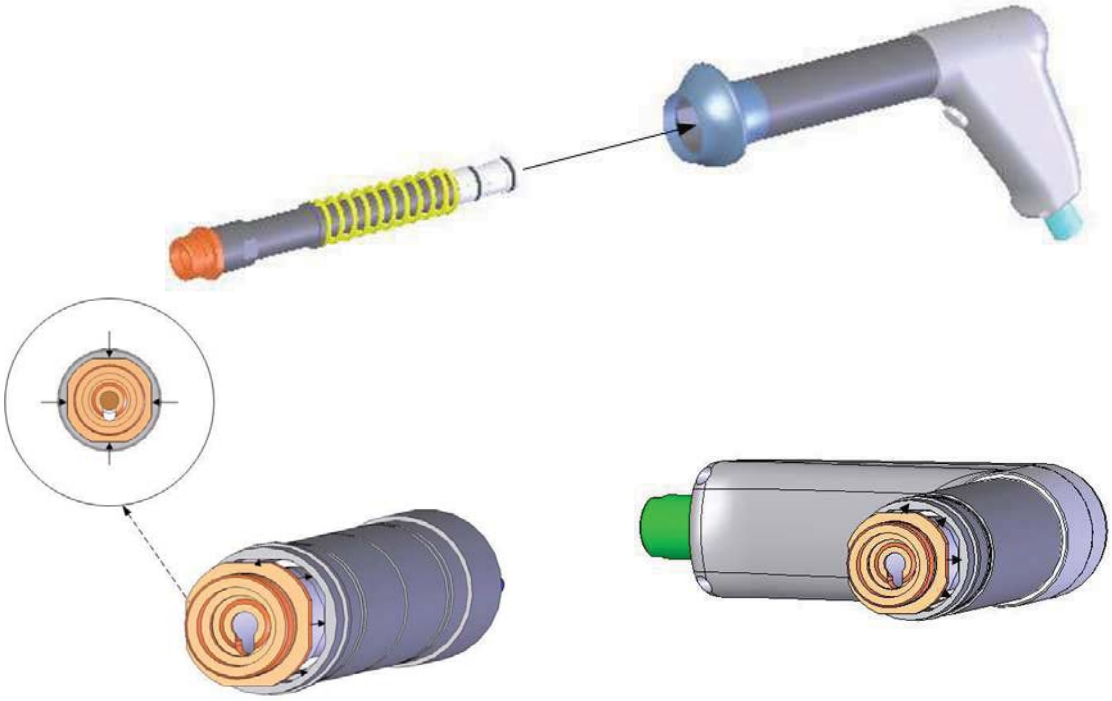
5. Remove the worn-out kit from the cartridge of the applicator.



6. Take out a new replaceable kit from the plastic cover.

7. Carefully insert the kit "as it is" into the cartridge of the applicator in the direction shown in the picture (do not touch the rear cover behind the spring, as it is coated with a thin layer of lubricant from production!).

   The front cover of the kit must be adjusted in position shown in the picture and inserted in one level with the edge of the outer case of the applicator (push the kit a tiny bit inside the case of the applicator). **The replaced kit must move freely!**



8. After the insertion of the kit, firmly screw the screw cap of the cartridge back using the key.

9. When replacing the applicator kit we recommend replacing the O-rings on the applicator attachment too. Spare O-rings are included in the accessories. Then put the applicator attachment (**14**) with both O-rings replaced back in.

10. Insert the shock transmitter back to the applicator (**14**) (including both O - rings).

11. Put the screw cap of the shock transmitter back on and screw it tightly by hand (**15**).

12. Connect the applicator back to the BTL - 5000 SWT device and finish the installation of the new kit according to the chapter **Applicator kit replacement wizard**.

7.2 SAFETY OF THE DEVICE

ATTENTION!

Only accessories connected to the connectors marked as follows can be applied to the client. The client's part is of BF type. Attention, the values of power, electric current or voltage can exceed the safe values of the power, current and voltage.

The device is equipped with a protective system against the connection of different equipment other than supplied by the manufacturer; consequently it does not allow for operation with equipment from other manufacturers.

Do not apply the shockwave to the areas with the body organs containing gases, or close to big nerves, vessels, spinal cord or the head!

The device does not use any pharmaceuticals or matters, which would be applied or were an integral part of the device.

The connectors marked with these signs can be connected with the foot pedal for initiation of the therapy. The foot pedal is placed under the bottom part of the shockwave compressor.

<u>General safety precautions:</u>

- Carefully read the service instructions before the first activation of the device.
- The device should only be used under the control of a physician who determined the indication.
- All personnel, using this device must be knowledgeable in the servicing technique, maintenance and verification of the device and about the principles of safe work with the device.
- Electrical mains connected to the device must be performed according to the existing valid standards (IEC 364) and must be certificated according to these standards. If you are not sure, that the power mains supply is in perfect order, carry out a technical revision by an engineering inspector.
- Crosscheck, whether the parameters of the power mains supply correspond with the requirements of the device according to the chapter **Technical parameters** and if the mains voltage switch on both units of the device is switched to the correct voltage according to the parameters of the power mains.
- The device is designed to work in an environment defined in the chapter **Technical parameters**. It must not be used in an environment with threats of e.g. explosion hazard, or water penetration. The device must not be used in connection with flammable anaesthetics, or oxidative gases (O2, N2O etc.).
- Place the device out of direct sunlight and out of reach of strong electromagnetic fields, to avoid undesirable interactions. In case of undesirable interactions place the device away from source of disturbance, or contact the authorised BTL service centre.
- Before every use, examine the device properly (loose cables, damaged cable insulation, the surface of accessories, functions of the display, operating elements etc.) and in case of any discrepancy stop using the device and contact the authorised BTL service centre. If the behaviour of the device shows any divergences from the function procedure described in the instruction manual, stop using the device and contact the authorised BTL service centre.

- If the device shows any signs of defects, or you are in doubt about its correct operation, stop the therapy immediately. If you cannot detect the source of doubts even after careful reading through the instruction manual, appeal to the authorised service department of the BTL device without delay. If the device is used contrary to this instruction manual, or it is used despite the device showing functional divergences from this instruction manual, then the user is responsible for any damage caused by the device!
- Do not disassemble the device in any case. Dismantling and unlocking the safety cover can cause danger of electric shock. Eventual replacement of the lithium battery and the air micro filter must by carried out by authorised BTL service centre.
- All materials and parts that come into direct contact with the client's body (detergents used for cleaning the shock transmitter ...), must meet the appropriate standards, relevant to irritation, allergization, toxicity genotoxicity, carcinogenity according to the standards ISO 10993 - 1, ISO 10993 - 3, ISO 10993 5. The user himself is responsible for all these materials and parts that were not supplied by the BTL device distributor.
- Do not connect the connectors used for the accessories and the other connectors with anything other than the equipment intended by the service instructions, as it can cause danger of electric shock and serious damage of the device!
- The device does not radiate or does not use any toxic materials during its operation, storage and transport under the given conditions.
- When transferring the device from a cold environment into warm, wait before plugging it into the power mains, until the temperature levels (2 hours minimum).
- Before starting the therapy, check whether all the adjusted parameters correspond to your requirements.
- The shock wave is used as the contact therapy – Do not in any case apply on damaged skin!
- Do not terminate the application by switching off the mains switch, but by pressing the **time / stop** (**11**) key. When switching the device off and on, there is a time delay necessary of at least 3 seconds.
- When disposing of the device after years of operation, it is necessary to remove the lithium battery. Dispose of it in a proper way – do not put the battery into the communal waste. The device can then be disposed of in the usual way. The device does not contain any toxic materials that could damage the environment when disposed of in the ecological way.
- It is not allowed to use the device and accessories other than according to the instruction manual.
- This device must be kept out of reach of the children.
- The device does not include any components to be reparable by the user, except the replacement kit. Do not remove any covers from the device. Repairs must always be provided by the authorised BTL service centre.
- Do not unplug the applicator during therapy.

7.3 WARRANTY CONDITIONS

The manufacturer provides a 24 months guarantee for the device from the date of purchase mentioned in the certificate of warranty, and 6 months for the accessories and the expendable supplies (guarantee does not apply to common wear of the parts).

Conditions of the guarantee determine, if the device is not used in compliance with this instruction manual, or unprofessional intervention to the device is carried out by third parties. In case of malfunction of the device always contact the authorized BTL service centre.

8 TECHNICAL PARAMETERS

Identification of the device	**BTL - 5000 SWT BASIC / BTL - 5000 SWT POWER**
Operating conditions	
Ambient temperature	+ 10 °C to+ 40 °C
Relative humidity	30 % to 75 %
Atmospheric pressure	700 hPa to 1060 hPa
Position	vertical – on legs
Type of operation	permanent
Transport and storage conditions	
Ambient temperature	- 10 °C to + 55 °C
Relative humidity	25 % to 85 %
Atmospheric pressure	650 hPa to 1100 hPa
Position of the main unit	any
Position of the compressor	basic
Storage time	max. 1 year
Additional conditions	transport only in the supplied packing
Power supply	
Main unit max. Input	80VA
Compressor maximum input	550VA
Mains voltage (switched)	~ 100 V to 120 V (115 V nominal), AC ~ 200 V to 240 V (230 V nominal), AC
Frequency	50 Hz to 60 Hz
Equipment protection class	II (according to IEC 536)
External exchangeable fuse	1xT1.6A / 250V, tube safety fuse 5 x 20 mm, according to IEC 127-2 (main unit) 2xT6.3A / 250V, tube safety fuse 5 x 20 mm, according to IEC 127-2 (compressor unit)
Power switch according to IEC 601 - 1	at the back of the device, position 0 and I
Design	
Weight – main unit only	max. 5.3 kg
Weight – compressor unit	max. 20 kg
Weight - applicator	max. 900 g including cable
Main unit dimensions (w x h x d)	230 x 390 x 260 mm
Compressor unit dimensions (w x h x d)	330 x 270 x 320 mm
Dimensions - applicator (w x h x d)	40 x 280 x 140 mm
IP code according to EN 60 529	IP 20
Display units	
Graphic colour touch screen	diag. 5.7" / 14.5 cm, resolution 320x240 pixels (BTL - 5000 SWT Basic) diag. 8.4" / 21.5 cm, 640x480 pixels (BTL - 5000 SWT Power)
Indicators	1x blue for the main unit 1x green, 1x yellow, 2x blue for the compressor
Classification	
Applied part type	BF
Class according to MDD 93/42/EEC	IIb

Adjustable values

Shock intensity	max. 3 / 5* Bar (maximum instantaneous value)
Shock frequency	max. 15 Hz / 22 Hz*
Therapy period	0 – 9999 shocks

*only for BTL- 5000 SWT POWER

Shockwave specifications

Maximum positive pressure	max. 15.8 MPa
Maximum negative pressure	max. 0.9 MPa
Energy density	0.25 mJ/mm^2

Steps of adjustable values

Intensity	0.1 Bar
Frequency	1 Hz
Total number of pulses per therapy	dynamically - according to size from 1 to 50 shocks

8.1 APPLICABLE STANDARDS

Name	**IEC, EN, ISO, MDD**
Medical electric device. Part 1: General requirements for safety	IEC 601-1
Appendices to EN 601-1	A2, A11 a A12
Medical electric device. Part 1-1: Systems	IEC 60601-1-1
Medical electric device. Part 1: EMC - requirements and examinations	IEC 60601-1-2
ISM – radio interference characteristics	EN 55011
EMC – electrostatic discharge	IEC 61000-4-2
EMC – radiated electromagnetic field	IEC 61000-4-3
EMC – fast electric transient effects/pulse groups	IEC 61000-4-4
EMC – shock pulse	IEC 61000-4-5
Medical electric device. Part 4: Programmable electric medical systems	IEC 60601-1-4
Medical device - risk analysis	ISO 14971
Bio-compatibility of medical device	ISO 10 993-1
Statutory rules for determination of technical requirements to sanitary engineering assets	NV 181/2001 Col. MDD 93/42/EEC
Particular requirements for the safety of equipments for extracorporeally induced lithotripsy	IEC 60601-2-36
Medical electrical equipment - Part 2-10: Particular requirements for the safety of nerve and muscle stimulators	IEC 60601-2-10
Clinical investigation of medical devices for human subjects	ISO 14155

8.2 MANUFACTURER

This product is manufactured in accordance with the EU Medical Devices Directive by:

BTL Industries Ltd.

161 Cleveland Way

Stevenage

Hertfordshire

SG1 6BU

United Kingdom

E-mail: sales@btlnet.com

http://www.btlnet.com

For service, please contact the service department at service@btlnet.com.

CE 0434

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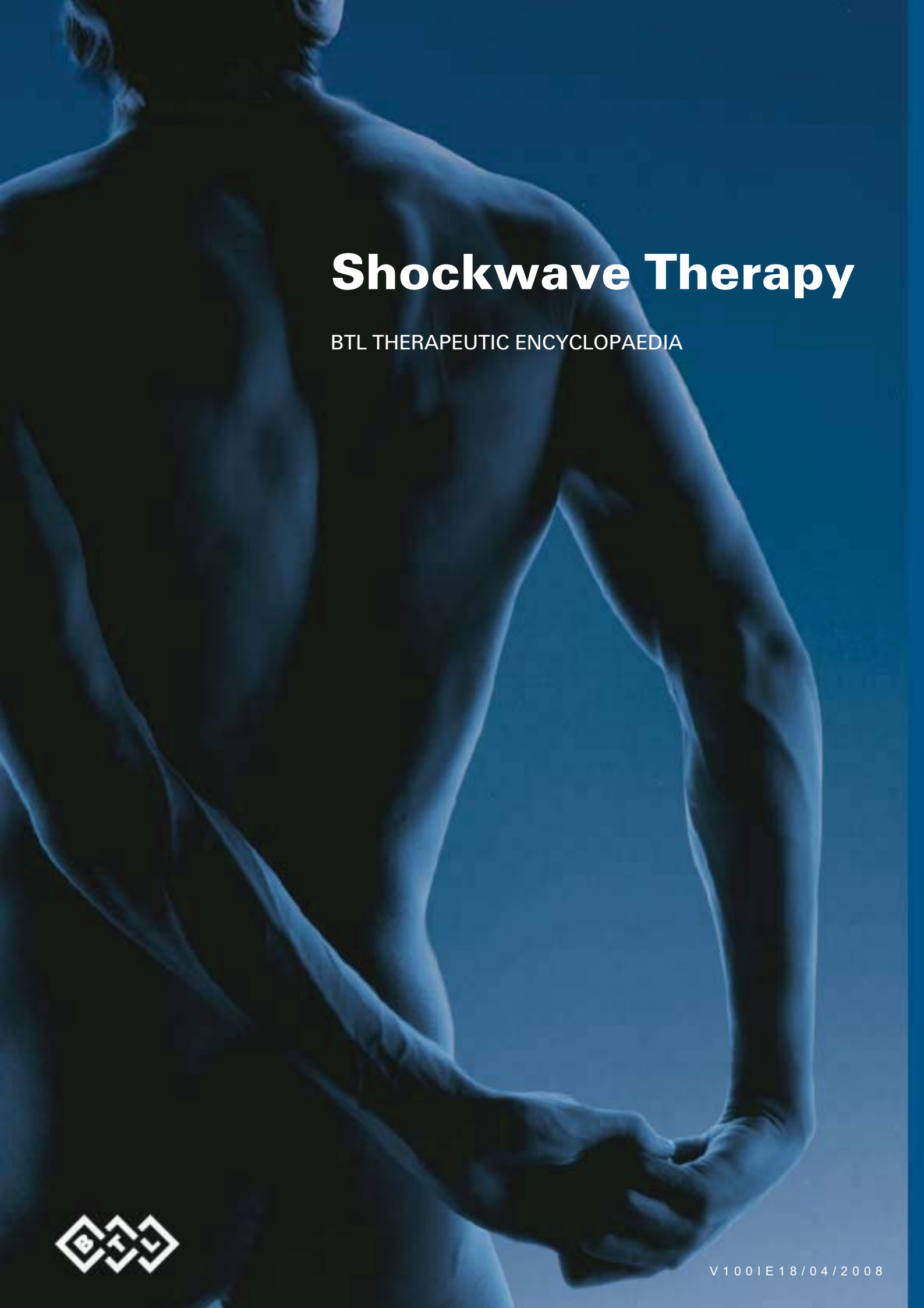
9 DEVICE CONFIGURATION

Type:	BTL-5000 SWT BASIC	BTL-5000 SWT POWER
Number of shockwave therapies	1	1
Display, diag.	colour touch screen diag. 5.7"	colour touch screen diag. 8.4"
Client's records	x	x
Encyclopaedia	x	x
Encyclopaedia with anatomical pictures	-	x
Predefined diagnosis	13	13
Preset programs	13	13
Language versions	x	x
Sound schemes	x	x
Colour schemes	x	x
Recent therapy	x	x
Electrotherapy upgrade	-	x
Laser therapy upgrade	-	x
Magnetic therapy upgrade	-	x
Ultrasound therapy upgrade	-	x
Additional applicator*	-	optional
Shockwave parameters :		
Pressure	1.5 - 3 Bar	1.5 - 5 Bar
Frequency	1 - 15 Hz	1 - 22 Hz
Individual shocks mode	x	x
Continual mode	x	x
Burst mode	-	x

* Possible simultaneous connection of two applicators



Shockwave Therapy

BTL THERAPEUTIC ENCYCLOPAEDIA

V100IE18/04/2008

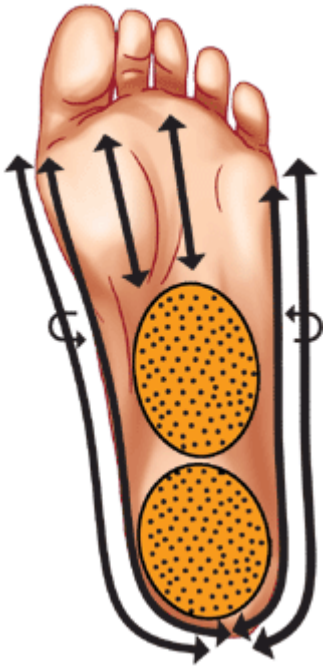
1 ..... **achillodynia** **3**
2 ..... **calcar calcanei, plantar fasciitis** **4**
3 ..... **exostoses of small hand joints in case of grade 1 arthrosis** **5**
4 ..... **pain in the area of the hip and the iliotibial tract** **6**
5 ..... **pain in the groin area** **7**
6 ..... **pain in the hamstring insertions** **8**
7 ..... **pain on the palmar side of the wrist** **9**
8 ..... **painful shoulder (calcification, tendonitis, impingement syndrome)** **10**
9 ..... **patellar tendinopathy (jumpers knee)** **11**
10 ..... **radial/ulnar epicondylitis** **12**
11 ..... **stimulation of acupuncture points** **13**
12 ..... **tibial edge syndrome** **14**
13 ..... **trigger points** **15**

1 ACHILLODYNIA

Program	W-0101 program: W-0101 achillodynia
Therapy parameters	type: continual pressure: 2 frequency: 10 number of shocks: 2000 scar area: no
Patient position	lying prone, leg supported under the ankle
Frequency of treatments	preferably within 5-10 days
Number of treatments	3 – 5 sessions
Process of treatment	Manual localization of painful points by means of palpation along the Achilles tendon. ~Application of gel. ~Start the therapy with 400 shocks, 2.5 bar, 5 Hz around the most painful point, subsequently treat the most painful point with approx. 1000 shocks, always longitudinally along the tendon, then apply successively on additional painful points in the calf. Increase the energy gradually up to 3 bar according to the patient's reaction, last 400 pulses apply with a frequency of 10 Hz. If needed, the number of shocks may be increased by additional 2,000 during one application.
Note	We recommend ultrasound examination of the Achilles tendon, especially in the patients who have formerly received local administration of corticosteroids. Painful points are indicated by the dotted areas in the picture. The arrows indicate the direction of movement of the applicator on related areas. (1108)

2 CALCAR CALCANEI, PLANTAR FASCIITIS

Program	W-0100 program: W-0100 calcar calcanei, plantar fasciitis
Therapy parameters	type: continual pressure: 2.5 frequency: 10 number of shocks: 2000 scar area: no
Patient position	Lying prone, leg supported under the ankle. Manual localization of the painful point by means of palpation.
Frequency of treatments	preferably within 5-10 days
Number of treatments	3 – 5 sessions
Process of treatment	Manual localization of painful points by means of palpation around the heel and on the sole. ~Application of gel. ~Start the therapy with 400 shocks, 2.5 bar, 10 Hz around the most painful point, subsequently treat the most painful point with approx. 1000 shocks, then apply successively in the surrounding tissues including the plantar aponeurosis and the Achilles tendon. Increase the energy gradually up to 3.5 bar according to the patient's reaction, last 400 pulses apply with a frequency of 15 Hz.
Note	If needed, the number of shocks may be increased to 2,500 during one application. Painful points are indicated by the dotted areas in the picture. The arrows indicate the direction of movement of the applicator on related areas. (1107)



3 EXOSTOSES OF SMALL HAND JOINTS IN CASE OF GRADE 1 ARTHROSIS

Program	W-0109 program: W-0109 exostoses of small hand joints in case of grade 1 arthrosis
Therapy parameters	type: continual pressure: 2 frequency: 10 number of shocks: 1500 scar area: no
Patient position	lying on back or sitting, arms in the right-angled flexion in the elbow, comfortably supported, preferably with a soft elastic pad
Frequency of treatments	preferably within 5-10 days
Number of treatments	3 – 5 sessions
Process of treatment	Palmar manual localization of painful points. ~Application of gel. ~Start the therapy with 400 shocks, 2 bar, 5 Hz around the most painful points, subsequently treat the most painful points with approx. 1000 shocks, last 400 pulses can be applied on the palm with a frequency of 10 Hz.
Note	Painful points are indicated by the dotted areas in the picture. The arrows indicate the direction of movement of the applicator on related areas. (1116)

4 PAIN IN THE AREA OF THE HIP AND THE ILIOTIBIAL TRACT

Program	W-0104 program: W-0104 pain in the area of the hip and the iliotibial tract
Therapy parameters	type: continual pressure: 2.5 frequency: 10 number of shocks: 2000 scar area: no
Patient position	lying on side
Frequency of treatments	preferably within 5-10 days
Number of treatments	3 – 5 sessions
Process of treatment	Manual localization of painful points in the trochanter major region and along the iliotibial tract. ~Application of gel. ~Start the therapy with 400 shocks, 2.5 bar, 10 Hz around the most painful point, subsequently treat the most painful point with approx. 1000 shocks, then apply successively along the iliotibial tract, last 400 pulses apply with a frequency of 15 Hz. ~If needed, the number of shocks may be increased by additional 2,000 during one application.
Note	Caution: Aim the shockwave at soft tissues only, avoid direct application on the bone! Painful points are indicated by the dotted areas in the picture. The arrows indicate the direction of movement of the applicator on related areas. (1111)

5 PAIN IN THE GROIN AREA

Program	W-0106 program: W-0106 pain in the groin area
Therapy parameters	type: continual pressure: 2.5 frequency: 10 number of shocks: 2000 scar area: no
Patient position	lying on back, lower extremity supported in slight semiflexion both in the hip joint and knee joint and in slight abduction
Frequency of treatments	preferably within 5-10 days
Number of treatments	3 – 5 sessions
Process of treatment	Manual localization of painful points in the groin region and along the muscles on the front and inner side of the thigh. ~ Application of gel. ~ Start the therapy with 400 shocks, 2.5 bar, 10 Hz around the most painful point, subsequently treat the most painful point with approx. 1000 shocks, then apply successively over the inner and front side of the thigh, last 400 pulses apply with a frequency of 15 Hz. ~ If needed, the number of shocks may be increased by additional 2,000 during one application.
Note	Caution: Avoid application on the inguinal channel (passage of large vessels and nerve bundles, lymph nodes). Painful points are indicated by the dotted areas in the picture. The arrows indicate the direction of movement of the applicator on related areas. (1113)

6 PAIN IN THE HAMSTRING INSERTIONS

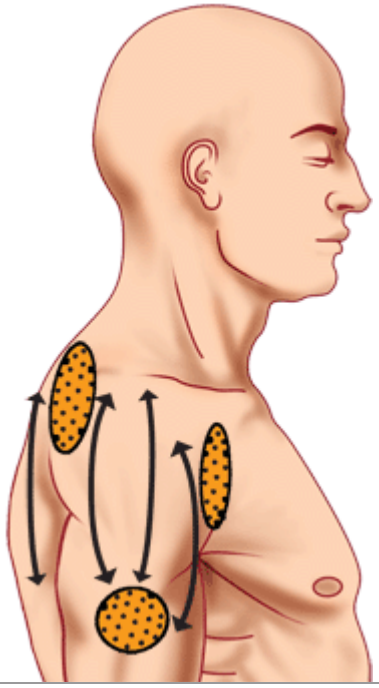
Program	W-0105 program: W-0105 pain in the hamstring insertions
Therapy parameters	type: continual pressure: 2.5 frequency: 10 number of shocks: 2000 scar area: no
Patient position	lying prone
Frequency of treatments	preferably within 5-10 days
Number of treatments	3 – 5 sessions
Process of treatment	Manual localization of painful points in the area of tuber ischiadicum and along the hamstrings. ~Application of gel. ~Start the therapy with 400 shocks, 2.5 bar, 10 Hz around the most painful point, subsequently treat the most painful point with approx. 1000 shocks, then apply successively over the rear side of the thigh, last 400 pulses apply with a frequency of 15 Hz.
Note	If needed, the number of shocks may be increased by additional 2,000 during one application. Painful points are indicated by the dotted areas in the picture. The arrows indicate the direction of movement of the applicator on related areas. (1112)

7 PAIN ON THE PALMAR SIDE OF THE WRIST

Program	W-0110 program: W-0110 pain on the palmar side of the wrist
Therapy parameters	type: continual pressure: 2 frequency: 10 number of shocks: 1500 scar area: no
Patient position	lying on back or sitting, arms in the right-angled flexion in the elbow, comfortably supported, preferably with a soft elastic pad
Frequency of treatments	preferably within 5-10 days
Number of treatments	3 – 5 sessions
Process of treatment	Palmar manual localization of painful points. Application of gel. Start the therapy with 400 shocks, 2 bar, 5 Hz around the most painful point, subsequently treat the most painful point with approx. 1000 shocks, last 400 pulses apply with a frequency of 10 Hz.
Note	Caution: Avoid the area of the passage of vessels and nerve bundles on the wrist! Painful points are indicated by the dotted areas in the picture. The arrows indicate the direction of movement of the applicator on related areas. (1117)

8 PAINFUL SHOULDER (CALCIFICATION, TENDONITIS, IMPINGEMENT SYNDROME)

Program	W-0107 program: W-0107 painful shoulder (calcification, tendonitis, impingement syndrome)
Therapy parameters	type: continual pressure: 3 frequency: 10 number of shocks: 2000 scar area: no
Patient position	lying on back or sitting
Frequency of treatments	preferably within 5-10 days
Number of treatments	3 – 5 sessions
Process of treatment	Manual localization of painful points in soft tissues around the shoulder joint by means of palpation, localization of painful points located in deeper structures by means of shockwaves. Application of gel. Start the therapy with 400 shocks, 3 bar, 10 Hz around the most painful point, subsequently treat the most painful point with approx. 1000 shocks, then apply successively in the entire shoulder girdle, last 400 pulses apply with a frequency of 15 Hz.
Note	We recommend performing ultrasound localization of calcifications. Painful points are indicated by the dotted areas in the picture. The arrows indicate the direction of movement of the applicator on related areas. (1114)

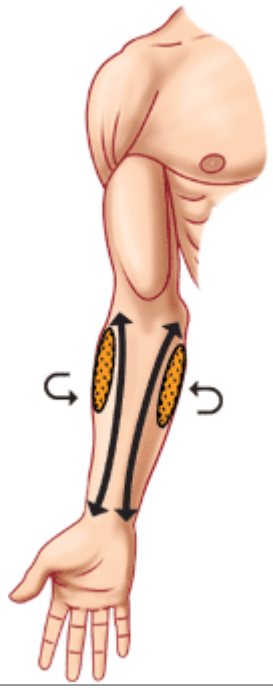


9 PATELLAR TENDINOPATHY (JUMPERS KNEE)

Program	W-0102 program: W-0102 patellar tendinopathy (jumpers knee)
Therapy parameters	type: continual pressure: 2 frequency: 10 number of shocks: 2000 scar area: no
Patient position	lying on back, supported knee
Frequency of treatments	preferably within 5-10 days
Number of treatments	3 – 5 sessions
Process of treatment	Manual localization of painful points by means of palpation on the edges of the patella and the insertion of m.quadriceps femoris. ~Application of gel. ~Start the therapy with 400 shocks, 2 bar, 5 Hz around the most painful point, subsequently treat the most painful point with approx. 1000 shocks, then apply successively on additional painful points on the thigh. Increase the energy gradually up to 3 bar according to the patient's reaction, last 400 pulses apply with a frequency of 10 Hz.
Note	If needed, the number of shocks may be increased by additional 2,000 during one application. Painful points are indicated by the dotted areas in the picture. The arrows indicate the direction of movement of the applicator on related areas. (1109)

10 RADIAL/ULNAR EPICONDYLITIS

Program	W-0108 program: W-0108 radial/ulnar epicondylitis
Therapy parameters	type: continual pressure: 2 frequency: 10 number of shocks: 2000 scar area: no
Patient position	lying on back or sitting, arms in the right-angled flexion in the elbow, comfortably supported, preferably with a soft elastic pad
Frequency of treatments	preferably within 5-10 days
Number of treatments	3 – 5 sessions
Process of treatment	Manual localization of painful points in the area of radial/ulnar epicondyle and along the related muscle groups of the forearm. ~Application of gel. ~Start the therapy with 400 shocks, 2 bar, 5 Hz around the most painful point, subsequently treat the most painful point with approx. 1000 shocks, then apply successively in the related muscle groups of the forearm, last 400 pulses apply with a frequency of 10 Hz.
Note	Painful points are indicated by the dotted areas in the picture. The arrows indicate the direction of movement of the applicator on related areas. (1115)



11 STIMULATION OF ACUPUNCTURE POINTS

Program	W-0112 program: W-0112 stimulation of acupuncture points
Therapy parameters	type: continual pressure: 1 frequency: 10 number of shocks: 500 scar area: no
Patient position	depending on the treated area
Frequency of treatments	preferably within 2-5 days
Number of treatments	3 – 10 sessions
Process of treatment	Apply directly on acupuncture points. (1119)

12 TIBIAL EDGE SYNDROME

Program	W-0103 program: W-0103 tibial edge syndrome
Therapy parameters	type: continual pressure: 1.5 frequency: 10 number of shocks: 2000 scar area: no
Patient position	lying on back, supported knee
Frequency of treatments	preferably within 5-10 days
Number of treatments	3 – 5 sessions
Process of treatment	Manual localization of painful points along the tibia. ~Application of gel. ~Start the therapy with 400 shocks, 1.5 bar, 5 Hz around the most painful point, subsequently treat the most painful point with approx. 1000 shocks, then apply successively on additional painful points. Increase the energy gradually up to 2.5 bar according to the patient's reaction, last 400 pulses apply with a frequency of 10 Hz. ~If needed, the number of shocks may be increased by additional 500 during one application.
Note	Caution: Aim the shockwave at soft tissues only, avoid direct application on the bone! Painful points are indicated by the dotted areas in the picture. The arrows indicate the direction of movement of the applicator on related areas. (1110)

13 TRIGGER POINTS

Program	W-0111 program: W-0111 trigger points
Therapy parameters	type: continual pressure: 2 frequency: 10 number of shocks: 2000 scar area: no
Patient position	depending on the treated area
Frequency of treatments	preferably within 5-10 days
Number of treatments	3 – 5 sessions
Process of treatment	Manual localization of trigger points by means of palpation. ~Application of gel. ~Apply directly on trigger points in the whole area. (1118)

BTL-5000 SWT Service Mode

USER'S MANUAL

100IE21/07/2008EN

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1 BRIEF DESCRIPTION OF THE SERVICE MENU - SERVICE MODE

In this mode it is possible to perform the distributor localization of the device, change the initial logo of the device, set the prefix of the device's name, change the address on the opening screen and set the system language in which the device will communicate with the user by default. Then it is possible to find out some technical parameters of the device, such as number and types of individual generators, versions of all components used in the device, number of diagnoses in the device, current limitations, etc. In addition it is possible to put the entire device into the demo mode. This mode serves mainly for service setting and testing of the device.

2 ENTERING THE SERVICE MODE

- Press the "ON/OFF" button to switch the device off
- Press the "enter" button and while holding it pressed switch the device on by the "ON/OFF" button
- After there appears the dialog box requesting for a service code or an access password, release the "enter" button. If the request for entering a password is enabled in the device, it is necessary to enter the password first. (If you do not know the password, enter the universal one: "00000000").
- Upon the request "enter service code" enter the code "7913" and press the "enter" button to confirm.
- After the device's opening screen appears, press the "menu" button – if the correct service code has been entered, the last menu item is "service functions – special".
- Select the "service functions – special" item and press "enter" to enter the device service setting mode.

3 DESCRIPTION OF INDIVIDUAL SERVICE MENU ITEMS

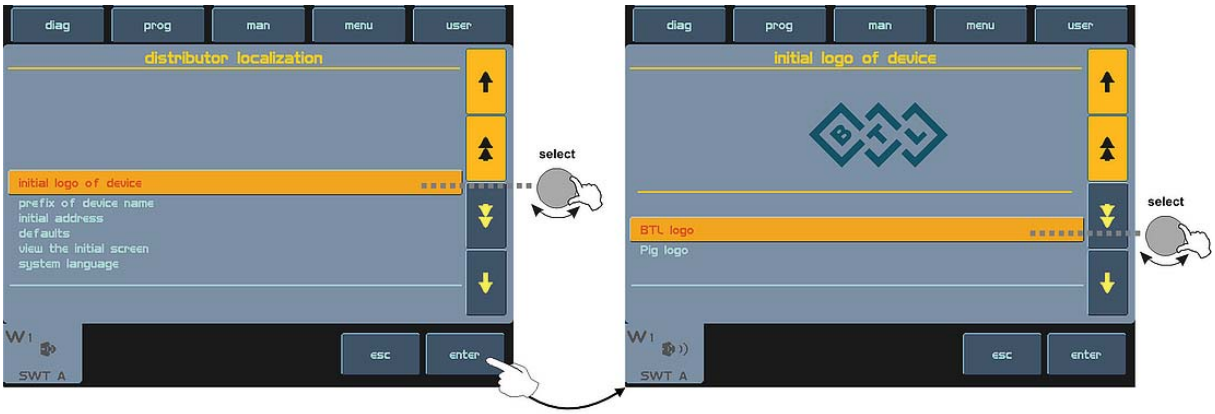
3.1 DISTRIBUTOR LOCALIZATION

3.1.1 INITIAL LOGO OF DEVICE

This item serves for change of logo on the opening screen of the device. It provides selection of several preset pictures and the "no logo" option in case of which the opening screen will not display any picture. For selection use the arrows or the "select" knob – the preview of the selected picture is in the upper part of the screen. To confirm selection of the displayed picture press "enter", to return without changes press "esc".

Note:

Possible additional pictures (logos) can be added to the device according to the supplied pattern; in case of any questions please contact the service department.



3.1.2 PREFIX OF DEVICE NAME

This item serves for change of prefix in front of the type name of the device. The current value is displayed in the upper part of the screen. To change the prefix press the button under the line where the current value is displayed. After pressing there appears a keyboard where the user prefix can be entered. To confirm press "enter", to return without changes press "esc".

Example:

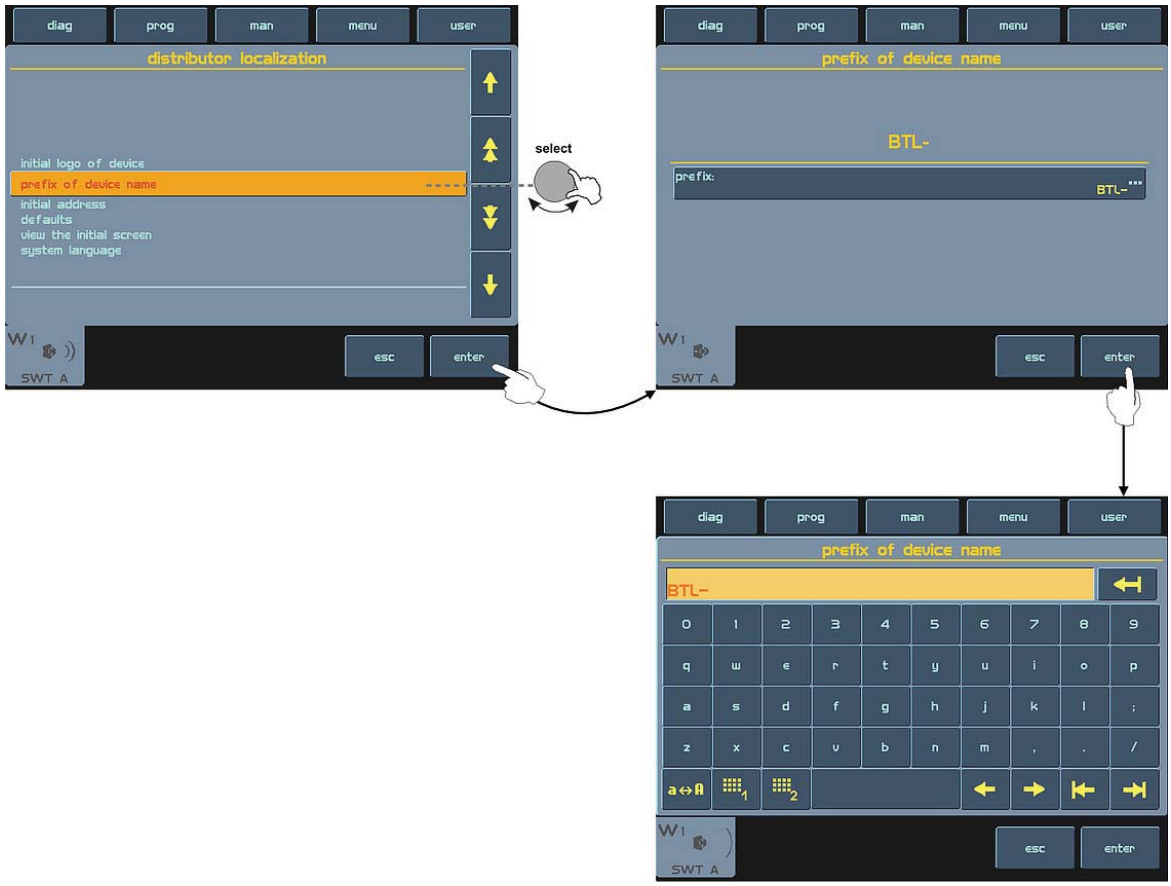
BTL-5000 SWT POWER:

"**BTL-**" = prefix of name, can be changed;

"**5000 SWT POWER**" = type name of the device, cannot be changed

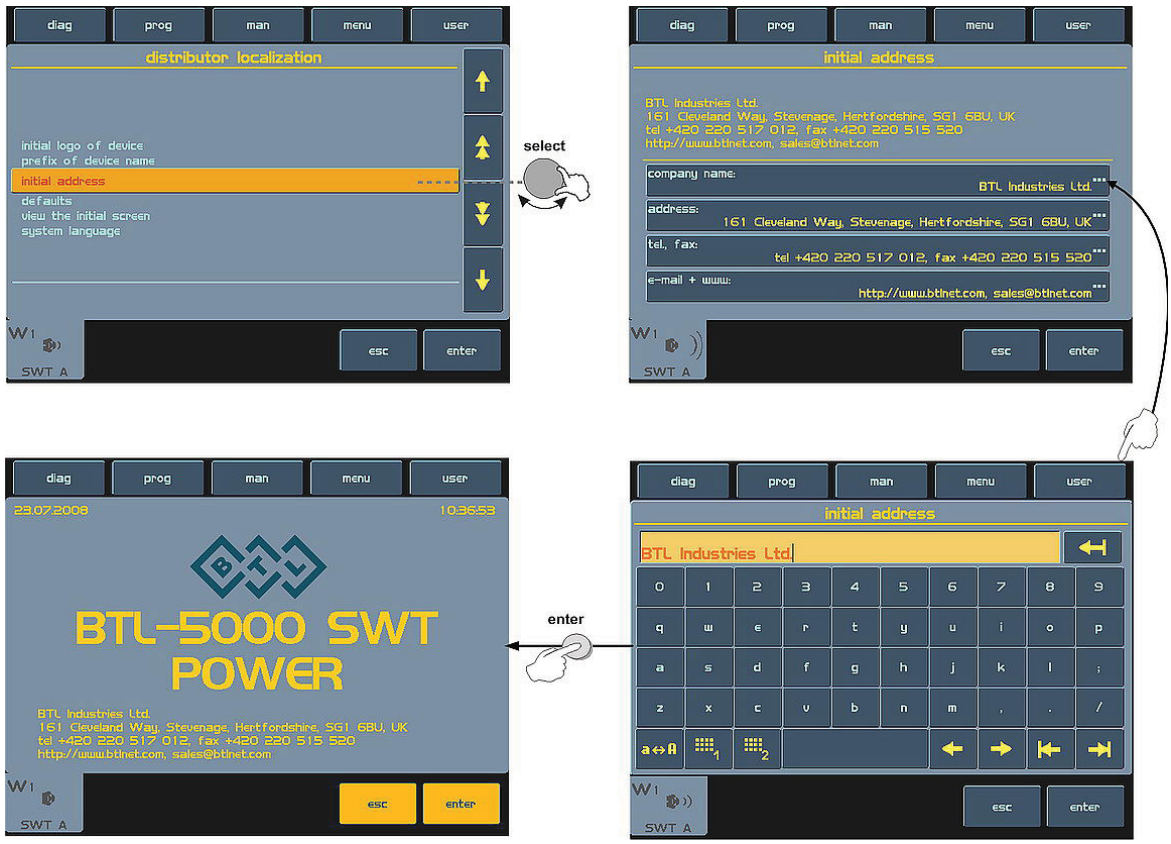
Note:

The prefix may be whatever, it is limited to one text line, longer text is not displayed. After switch-on of the national keyboard it is also possible to enter special characters.



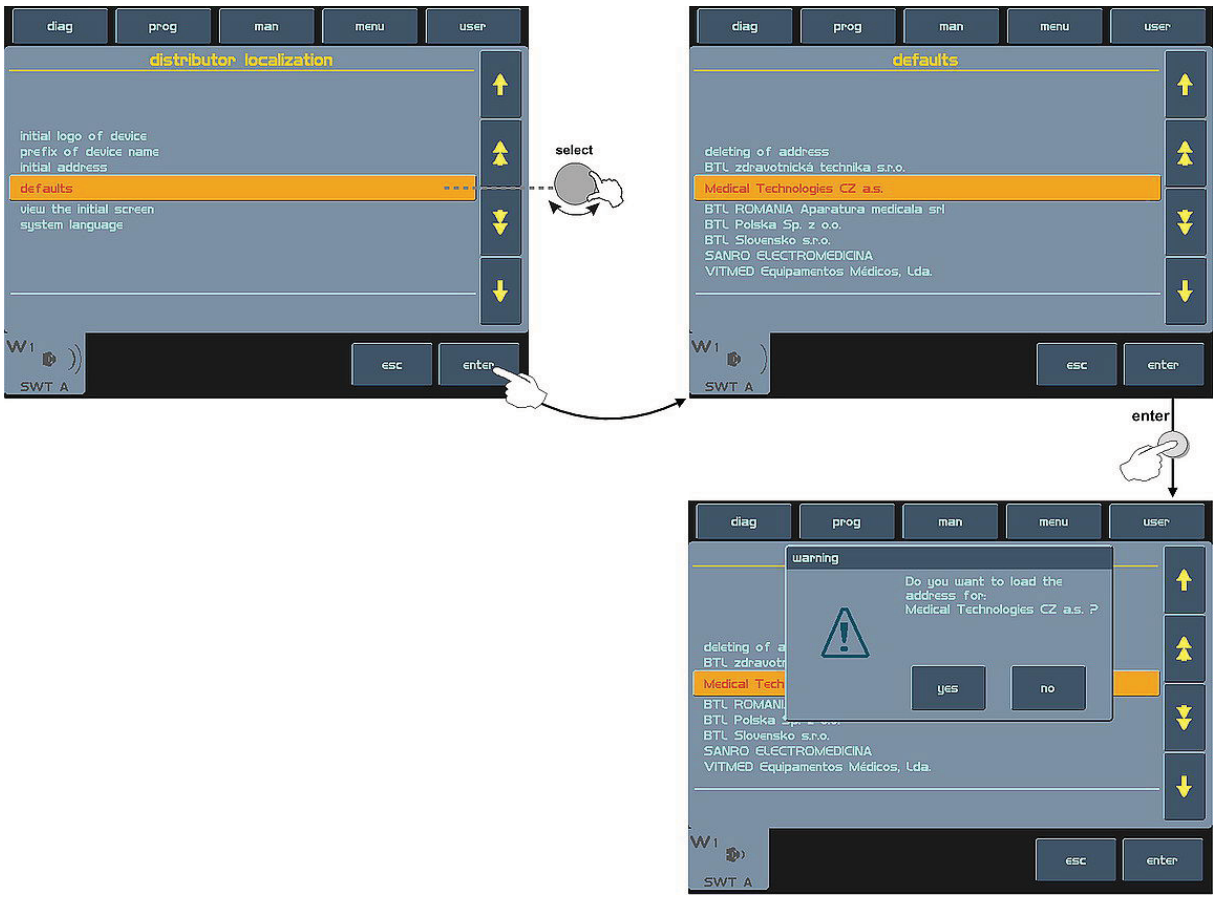
3.1.3 INITIAL ADDRESS

This item serves for change of the address displayed on the opening screen. The current address is displayed in the upper part of the screen; if you want to change it, press the button containing the item to be changed below the line – then there appears a keyboard where the user address, company name, phone number etc. can be entered. To confirm press "enter", to return without changes press "esc".



3.1.4 DEFAULTS

The device provides preset addresses, so that it is not necessary to fill in always the full address. It is also possible to quickly and completely delete the entire address. After selection of the address the program requires confirmation and then the selected address shall be set. To view or edit the address follow the above-described process. To exit the screen press "enter" or "esc".

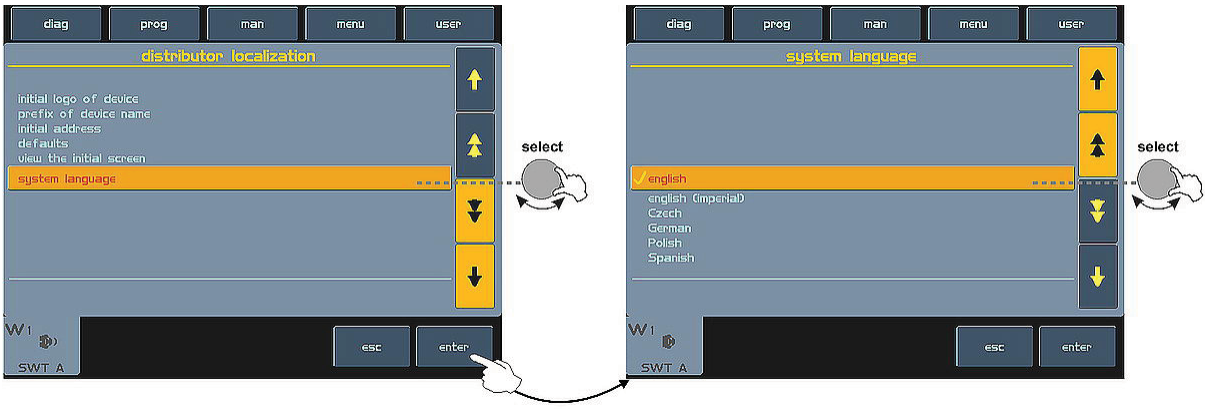


3.1.5 VIEW THE OPENING SCREEN

This item serves for clear displaying of the full opening screen as it will look like on the device's display. To exit the screen press "enter" or "esc".

3.1.6 SYSTEM LANGUAGE

This item serves for setting of the language which the device switches to if the user selects to delete all data or to restore the factory settings. The screen displays a select menu containing all languages that are loaded in the device. The current language has a checkmark to the left. For selection use the arrows and then press "enter"; to exit the menu without change of language press "esc".



3.2 SPECIAL SETTING

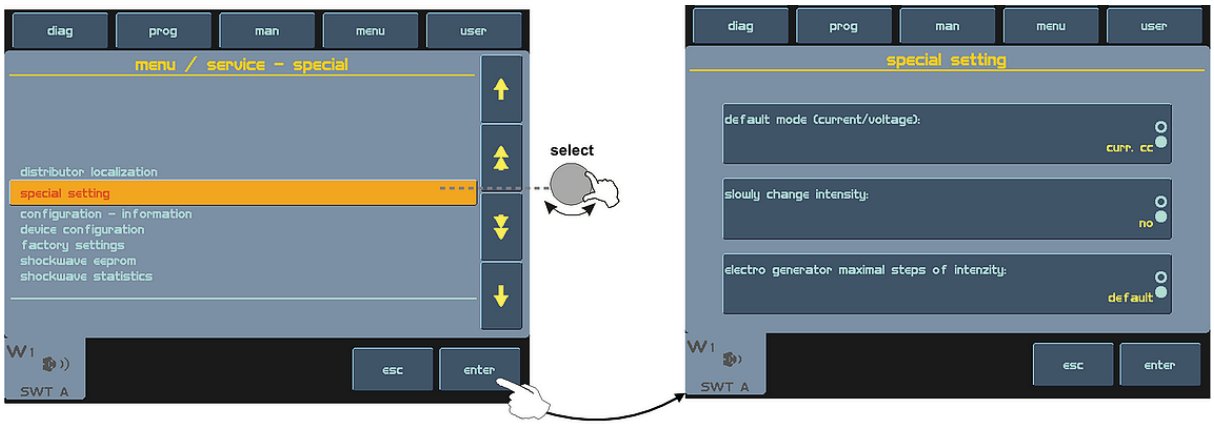
Items from this submenu are relating to the Electro generator.

Default mode function enables to select as a default unit for electro generator the voltage or current unit.

Slowly change intensity: determines the speed of setting přírustku intensity

Electro generator maximal steps of intensity determines how many mA will be changed by one slight turning of knob. **Velikost jednoho kroku přidání intensity**

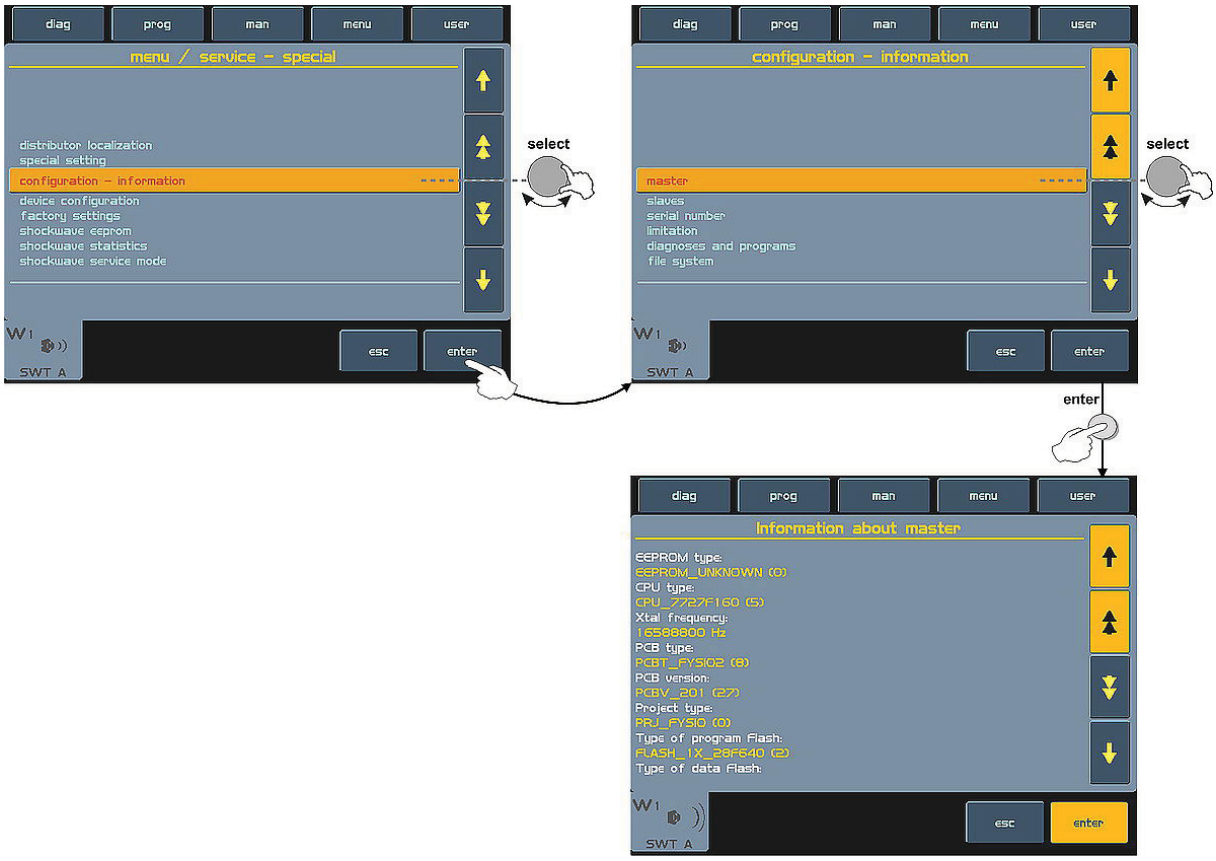
Note: If your device does not include electro generator, do not use this function.



3.3 CONFIGURATION - INFORMATION

3.3.1 MASTER

This item contains information about all major electronic components in the device. It is designed especially for service purposes and for possible communication with the service department. For movement in the displayed page use the arrows or the "select" knob. To return to the previous screen press "enter" or "esc".

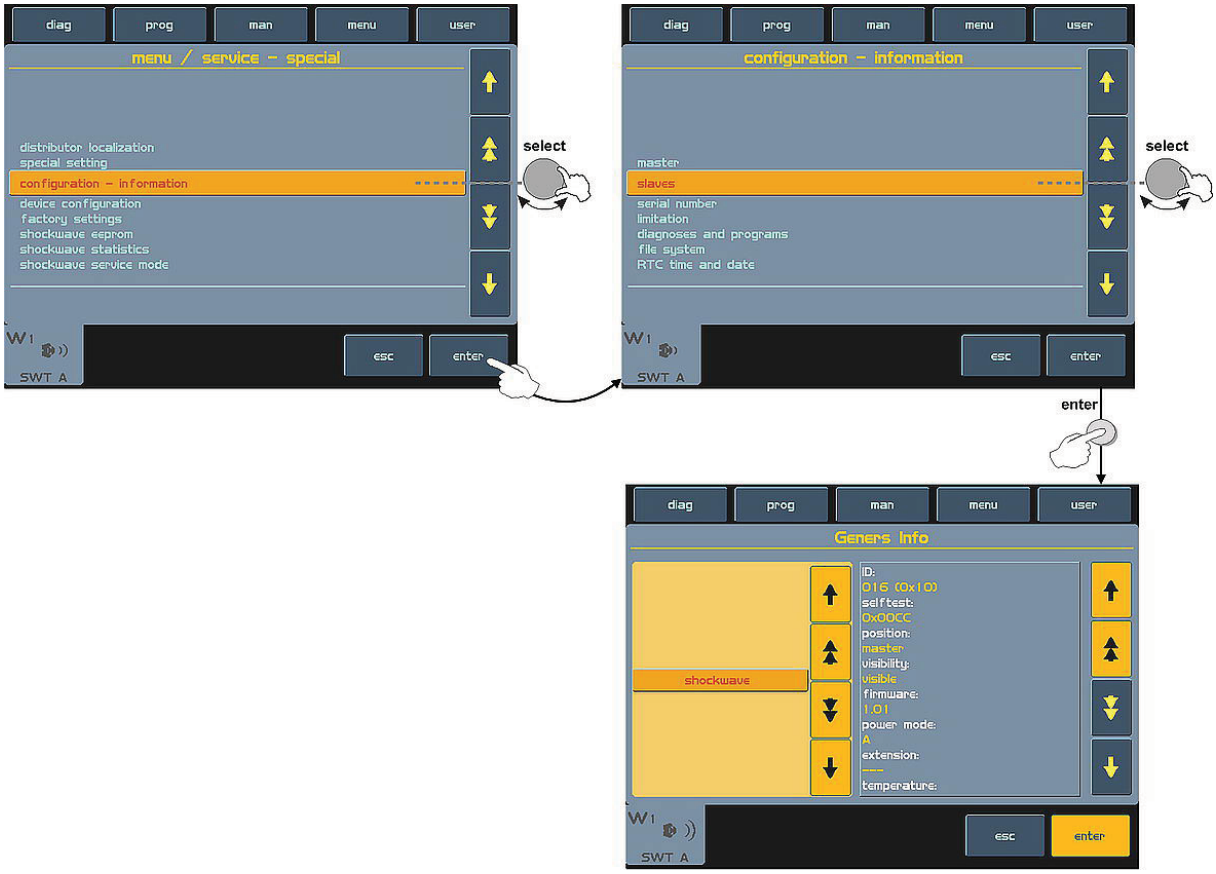


3.3.2 SLAVES

This item contains information about all generators installed in the device. Here it is possible to find out which generators are installed in the device, what are their software versions, what is their temperature, etc. It is possible to install 4 generators at the most. To return to the previous screen press "enter" or "esc".

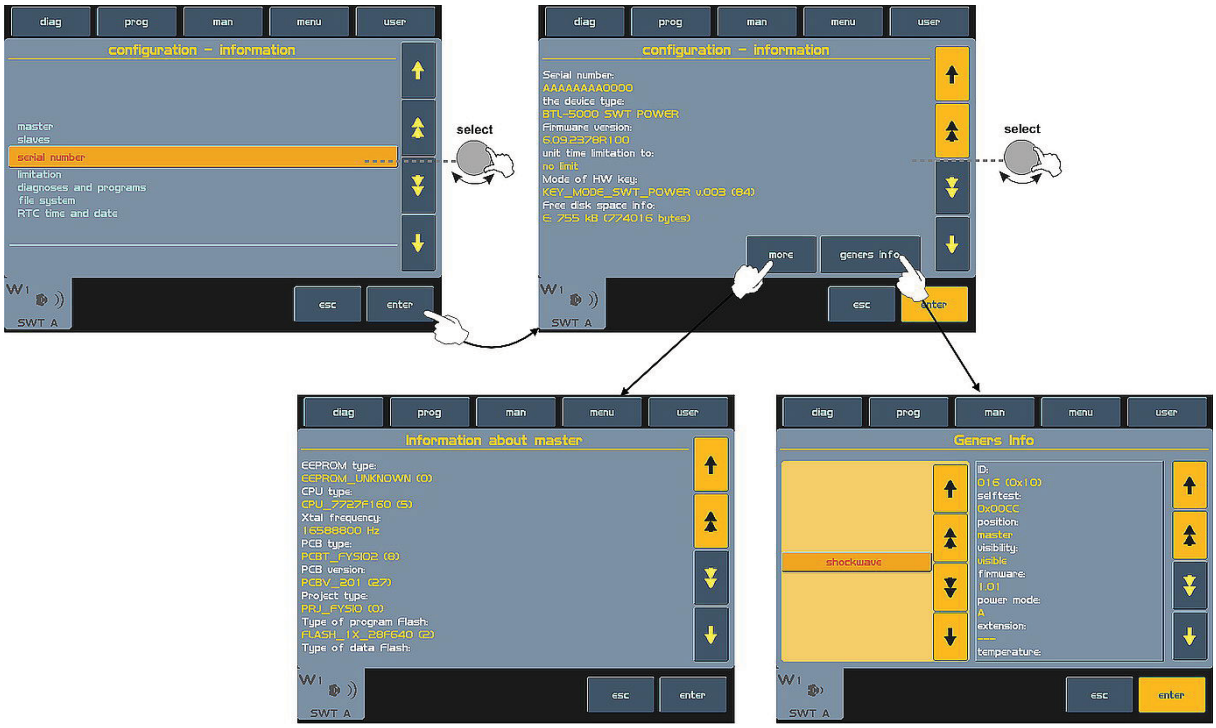
Note:

All the connected generators are displayed here, regardless of the variant of the device, and the number of the displayed generators need not correspond to the number of generators which the device works with in the standard mode. For example, if the device is in variant "N = non-upgradable" it works always with one permitted generator, regardless of how many they actually are in the device.



3.3.3 SERIAL NUMBER

This item contains information about the serial number of the device, the loaded program version, the device number in the network and the time limits of operation. The entire screen is also accessible from the standard mode via the menu. To return to the previous screen press "enter" or "esc".

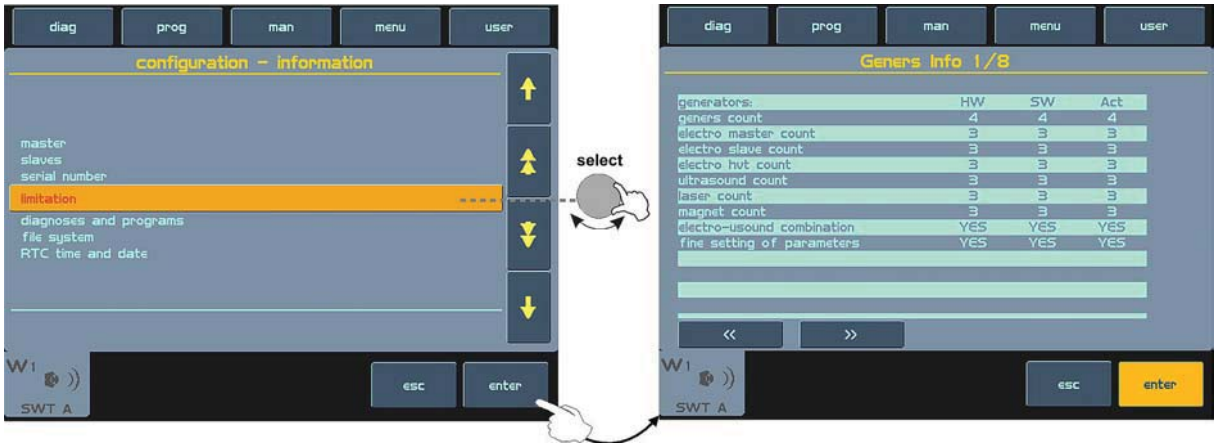


3.3.4 LIMITATION

This item displays information about the set limitation of the device. It contains limitation of all possible items. The whole information consists of 8 screens with similar structure. For smooth switching among the screens use the buttons with symbols ">>" or "<<".

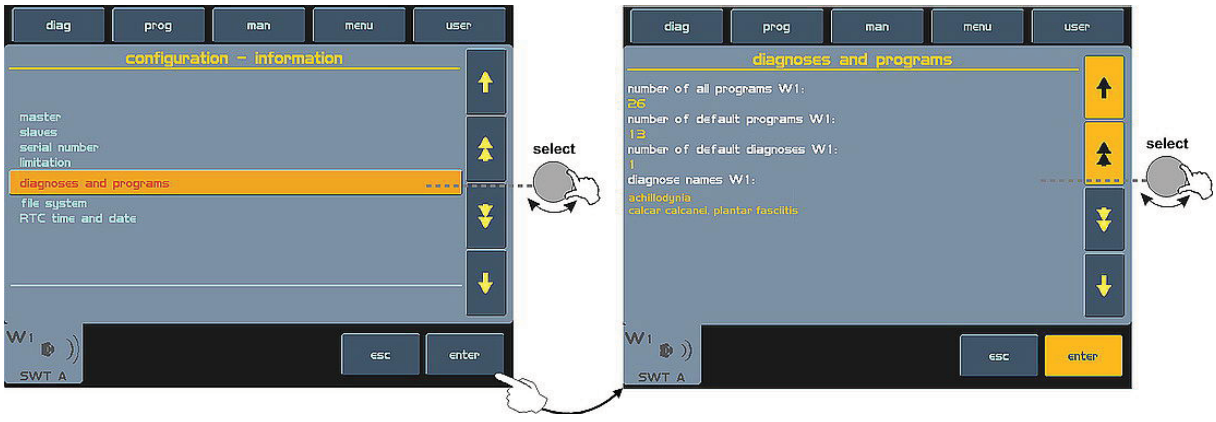
Structure of information: The header of the table displays titles of the columns. The first column displays what the limitation refers to (type of current or therapy, number of generators, etc.). The second column labelled "HW" displays limitation determined by the hardware key of the device. The third column displays limitation determined by the software used in the device. The fourth column labelled "Act" displays the resulting (current) limitation which is set according to the previous two columns and according to the generators which are installed in the device. The value "YES" indicates that the device supports the respective type, the value "NO" indicates that the item is forbidden.

To return to the previous screen press "esc".



3.3.5 DIAGNOSES AND PROGRAMS

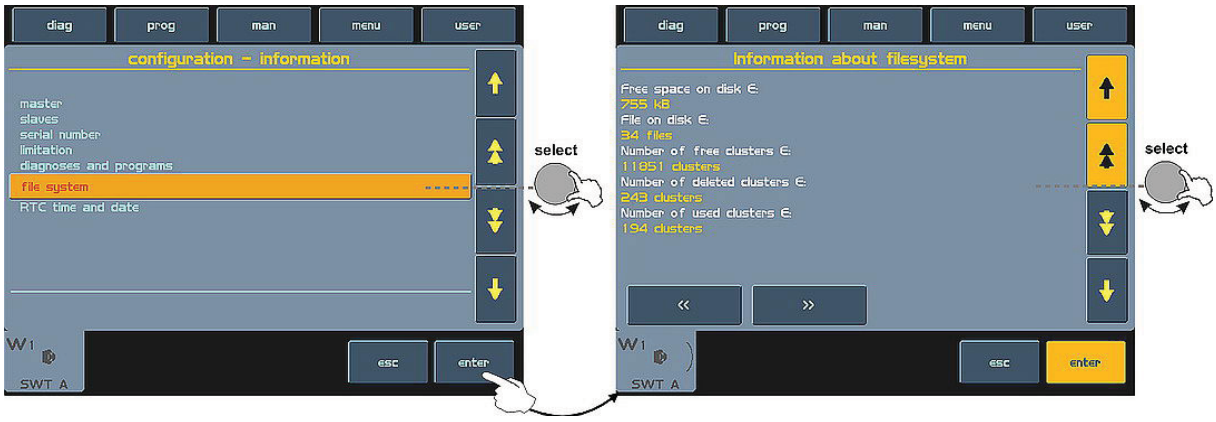
This item displays information of all diagnoses and programs in the device. To return to the previous screen press "esc".



3.3.6 FILE SYSTEM

This item displays information about the file systems in the device. The information is displayed separately for each file system; for switching among them use the ">>" or "<<" buttons. The "E" file system is designed for saving of all user data, the "S" file system serves for system purposes and is not accessible to the user.

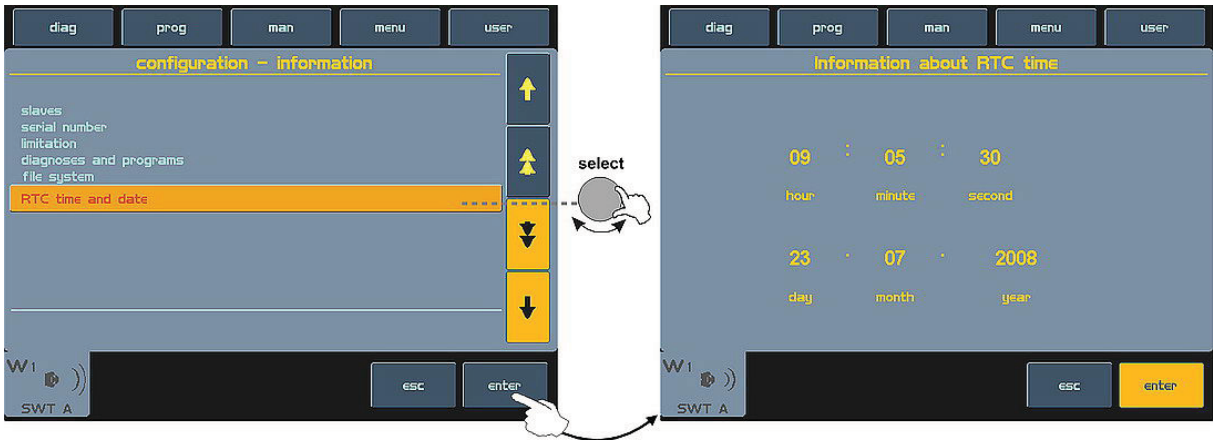
The information about free space is available also to the user, in the service functions during standard operation. This information serves mostly for service purposes. To return to the previous screen press "esc".



3.3.7 RTC TIME AND DATE

This item displays information about the internal time of the device. This value cannot be changed and serves only for information. It can differ from the actual date and time. For setting date and time use menu during standard operation of the device.

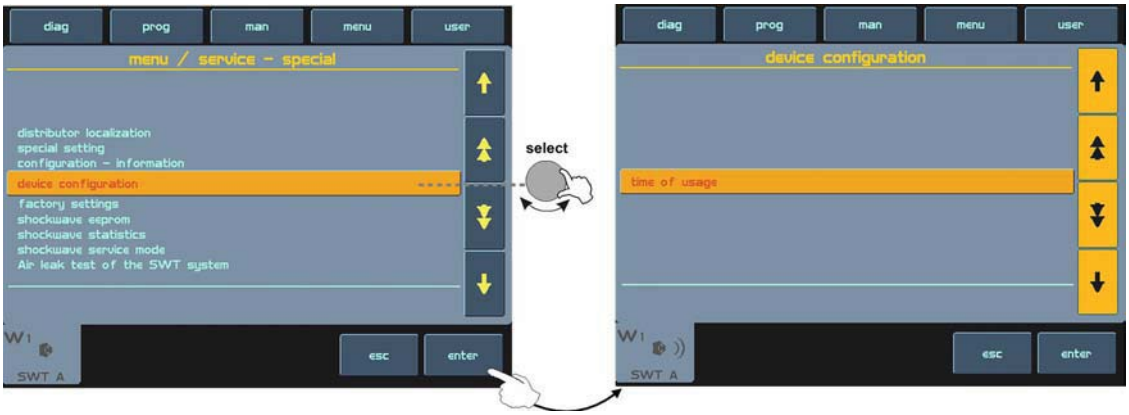
This information serves for service purposes. To return to the previous screen press "esc".



3.4 DEVICE CONFIGURATION

3.4.1 TIME OF USAGE

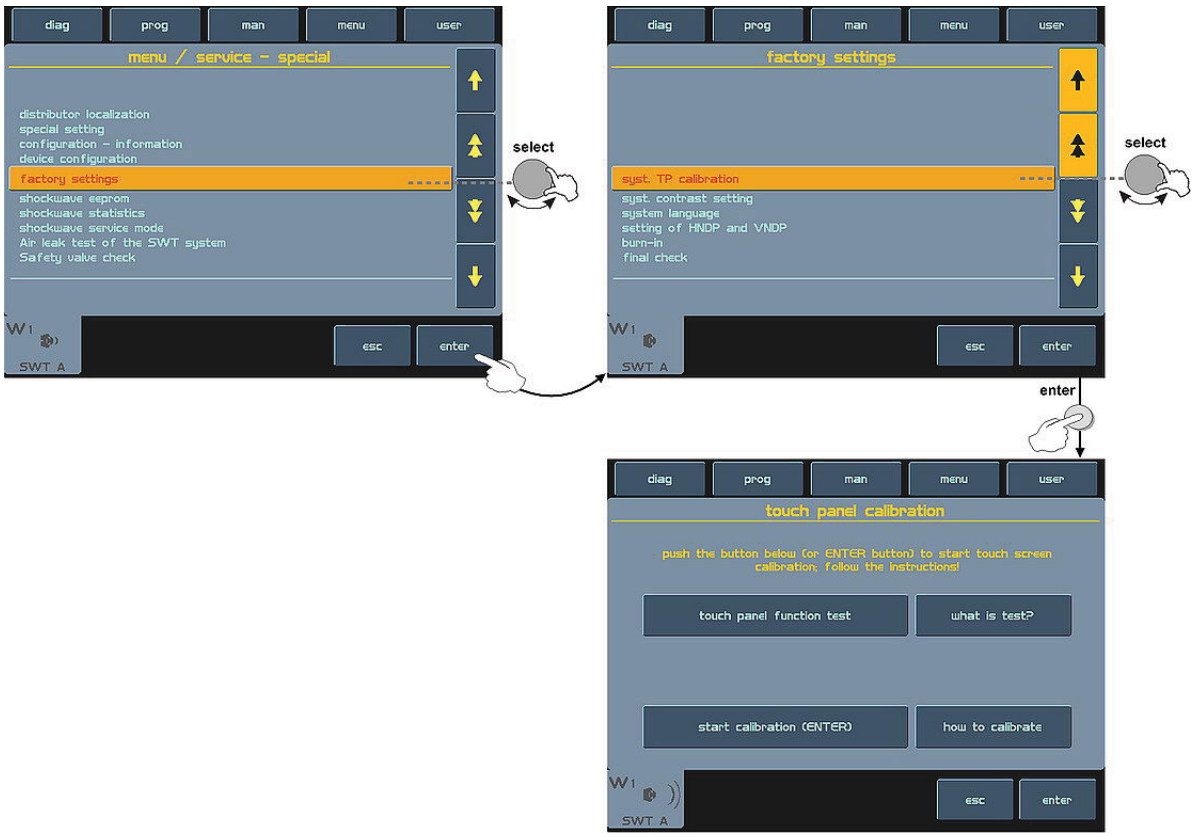
This item serves for checking the operational time limitation of device when the operation of the device is time limited.



3.5 FACTORY SETTINGS

3.5.1 SYST. TP CALIBRATION

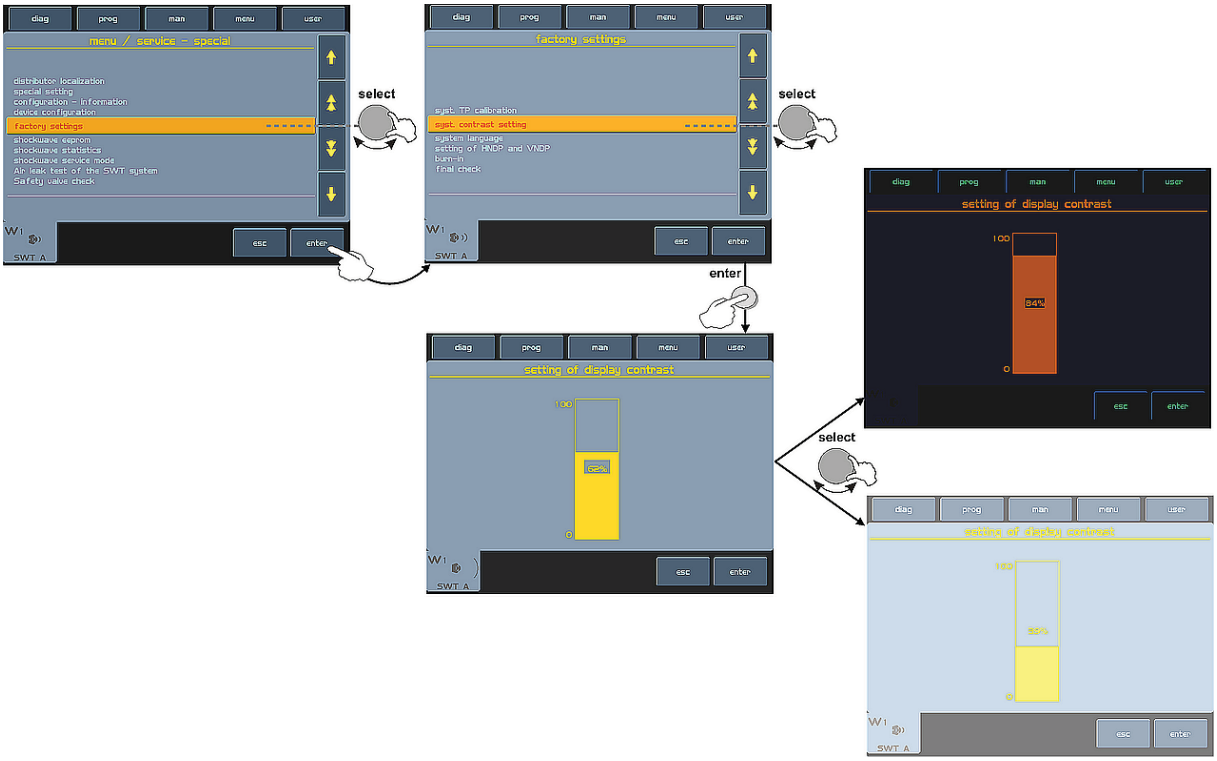
This item serves for factory calibration of the touch panel. The values saved during this calibration are used if the user selects return to the factory settings or file system formatting. The process of calibration is the same as in the standard mode of the device. After start of the calibration first touch in the upper right corner of the display (follow the displayed instructions), then in the lower left corner (again follow the displayed instructions). Then it is possible to check the successfulness of the calibration – when touching the display there should always appear a small white square and the tip of the touch pen shall be inside it. It is necessary to test particularly all four corners of the display. If calibration is OK, confirm and save it by touching in the centre of the display; if it is not, press "esc" to cancel the calibration mode without saving changes and start calibration again.



3.5.2 SYST. CONTRAST SETTING

This function serves for factory setting of the display contrast. The stored value is used if the user selects restoration of the factory settings or file system formatting. The contrast setting is the same as in the standard mode of the device (except in case of fast setting by simultaneous pressing of "esc"+"enter" and turning of the "select" knob).

After selection of this function the screen displays the bar graph with the current value. To change contrast turn the "select" knob. The change of contrast appears immediately on the display. The set contrast should make the display well readable. To save the set value press "enter". To return to the previous screen without saving the new value of contrast press "esc".

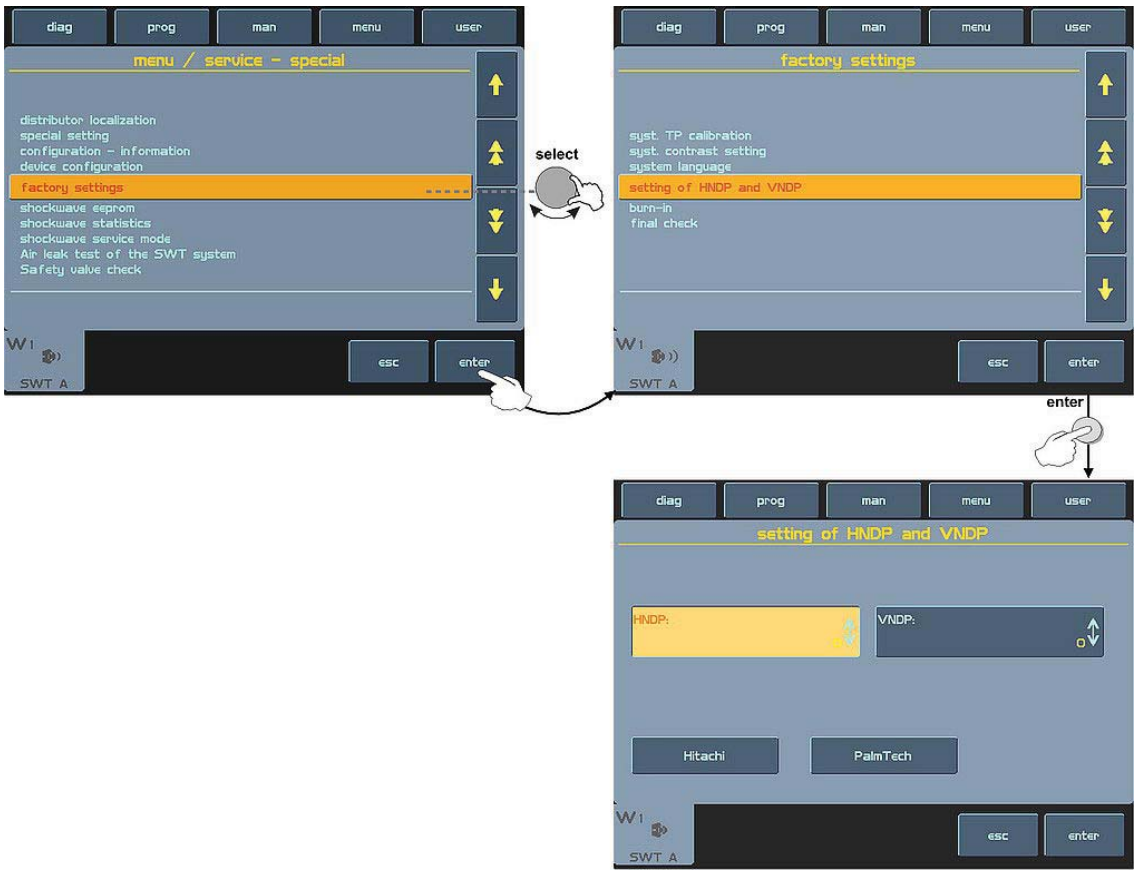


3.5.3 SYSTEM LANGUAGE

This item serves for setting of the language which the device switches to if the user selects to delete all data or to restore the factory settings. The screen displays a select menu containing all languages that are loaded in the device. The current language has a checkmark to the left. For selection use the arrows and then press "enter"; to exit the menu without change of language press "esc".

3.5.4 SETTING OF HNDP AND VNDP

This function serves for setting of frequency characteristics of the display. The used default values need not be changed. Change of these values affects the quality of displaying and the refresh frequency of the display.



3.5.5 BURN-IN

This function serves for burn-in of completely assembled and set device. The burn-in process is controlled by an internal program. The program is designed so that the device is loaded as much as possible, but, at the same time, that the load corresponds to the real use of the device. From the view of reliability, the most critical aspect is periodical heating and cooling of the device. The burn-in program works in periods. During each period one half of the device (= one half of all generators) is switched on at full power and the other half is switched off. After expiration of the period the halves swap. The total time of burn-in is not limited and depends on the operator. The display informs about the current status (number of passed periods and total time of burn-in). Before starting, the operator can change duration time of the period. To start/stop this function press the respective button.

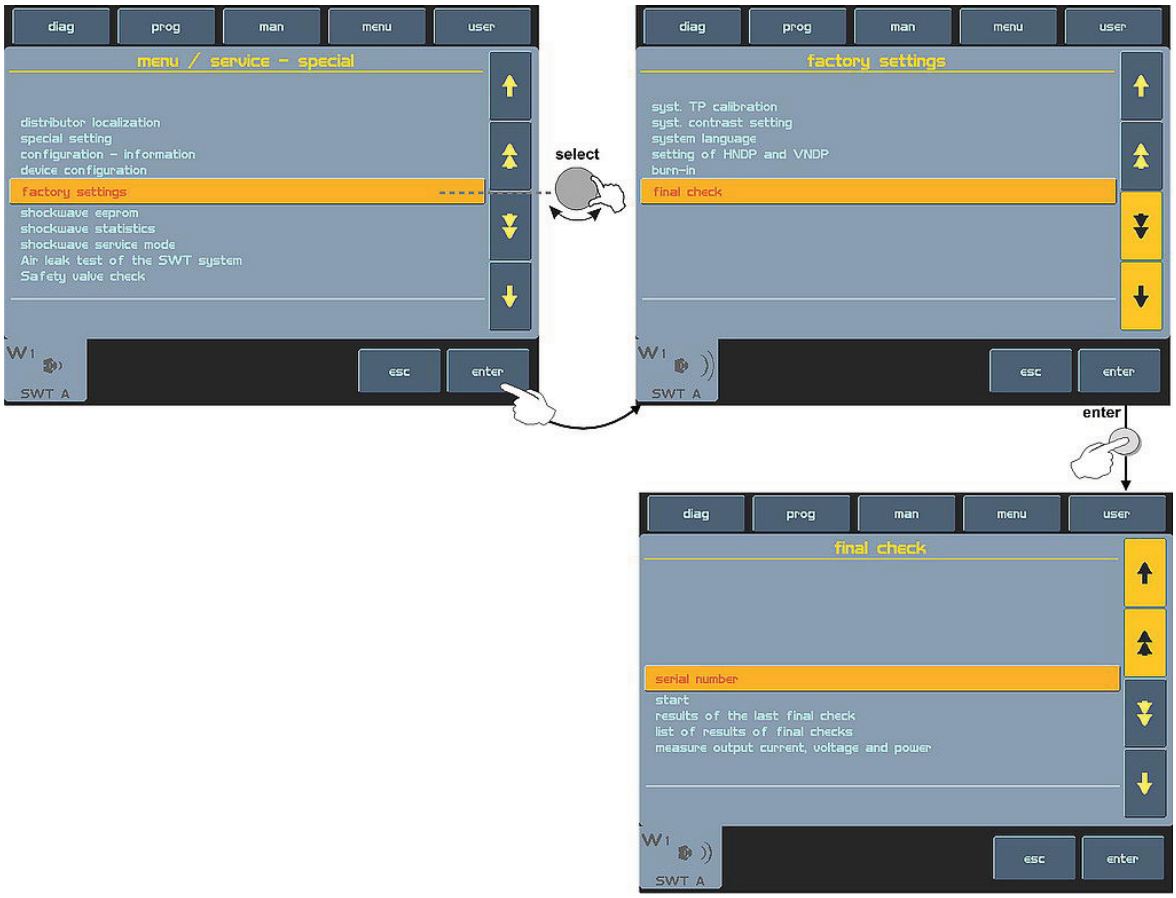
3.5.6 FINAL CHECK

This function serves for final testing of most of the functions and modules in the device. The function runs step by step and the operator has to successively fulfil all requirements described on the display of the device. If all requirements of a particular point in the final check are fulfilled, press the "pass" button, otherwise press the "fail" button; for moving among the individual points of final check use the buttons with symbols ">>" and "<<". The "reset" button serves for putting the point into the initial state, e.g. if you want to check the point again. After completion of all points of the final check there is displayed an overview of the test results; this overview is saved in the memory of the device together with the date of check. To leave the final check press "esc".

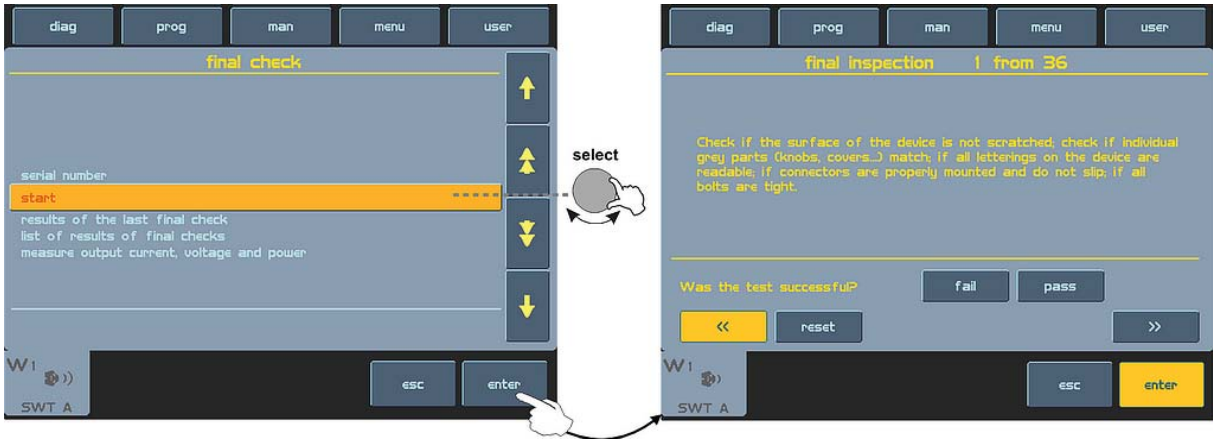
The user can view the results of the last check as well as those of all the previous checks.

The "serial number" item is only information for the operator, in case of filling in the paper report.

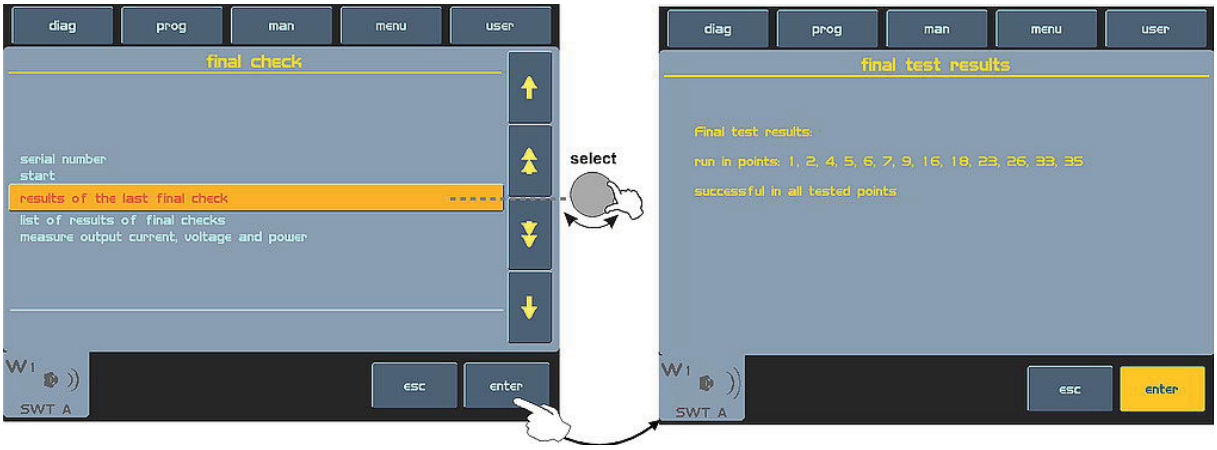
SERIAL NUMBER



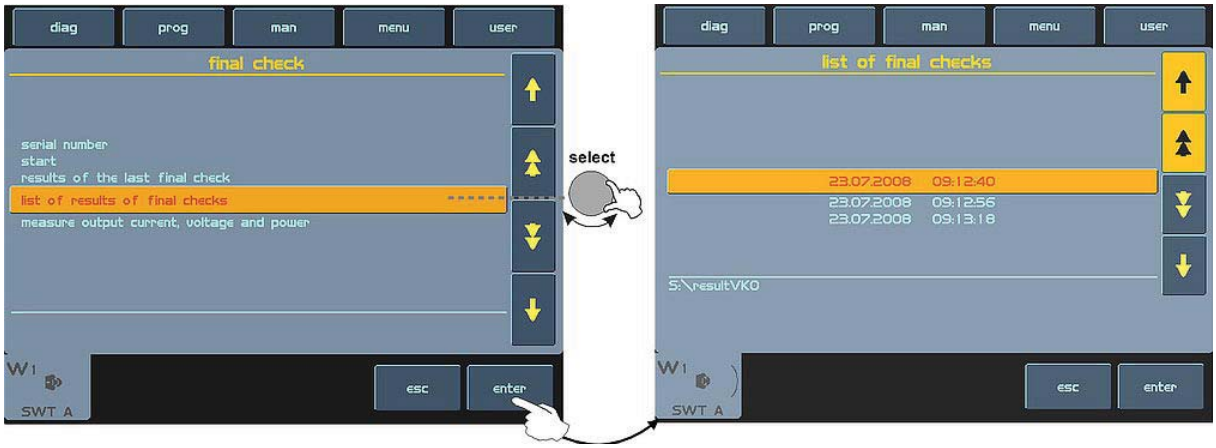
START



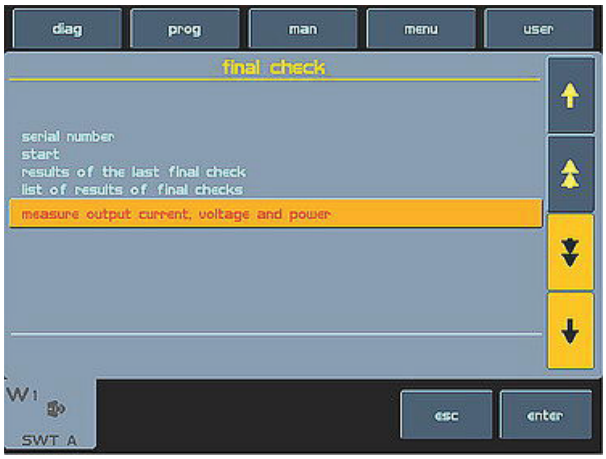
RESULTS OF THE LAST FINAL CHECK



LIST OF RESULTS OF FINAL CHECK



MEASURE OUTPUT CURRENT, VOLTAGE AND POWER



3.6 SERVICE FUNCTIONS

3.6.1 FORMAT AND SCANDISK

The functions work in the same way as the similar service functions in the standard operation.

Attention!

Function "format" deletes all user data and settings in the device.

3.6.2 BURN-IN

Similar to the function in factory settings (see above).

3.6.3 FINAL CHECK

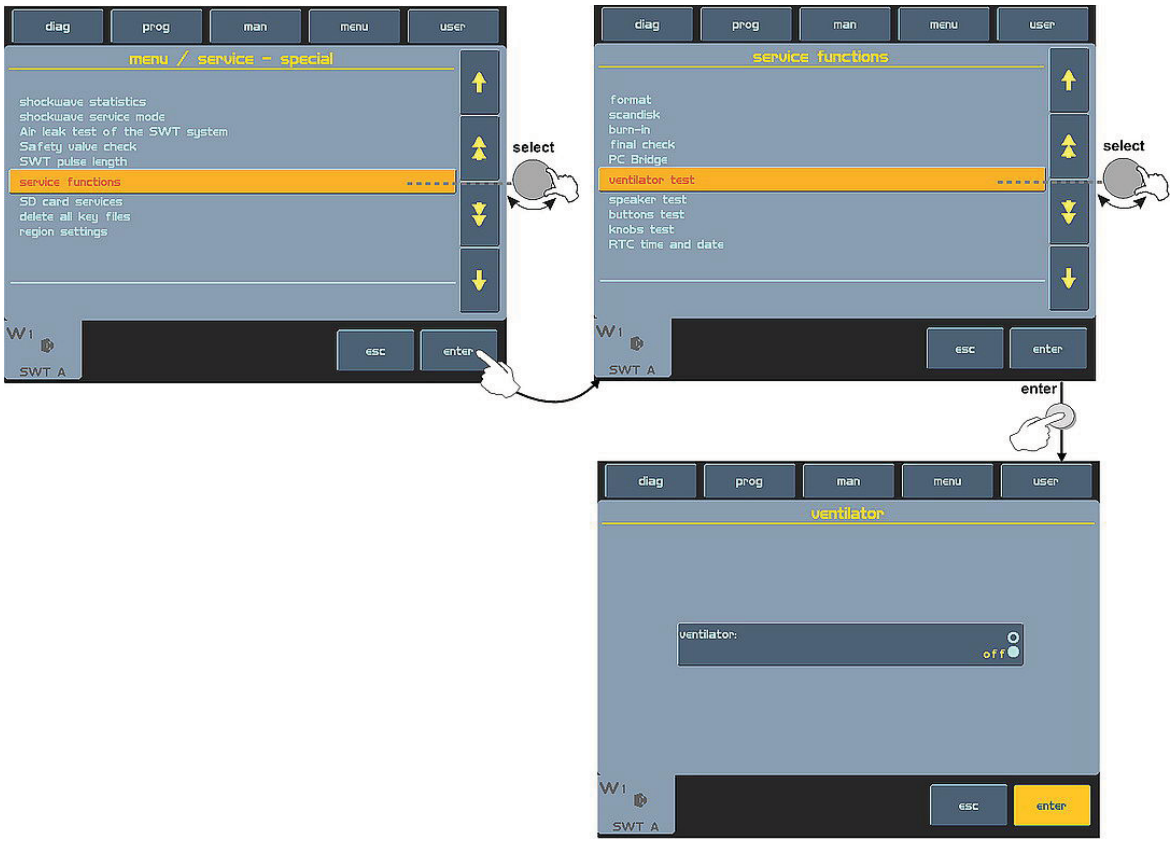
Similar to the function in factory settings (see above).

3.6.4 PC BRIDGE

A specialized function for control of internal generators in the device directly from the PC. The device switches over to the mode in which it only forwards data from PC to the respective generator. This function is used for development and service purposes.

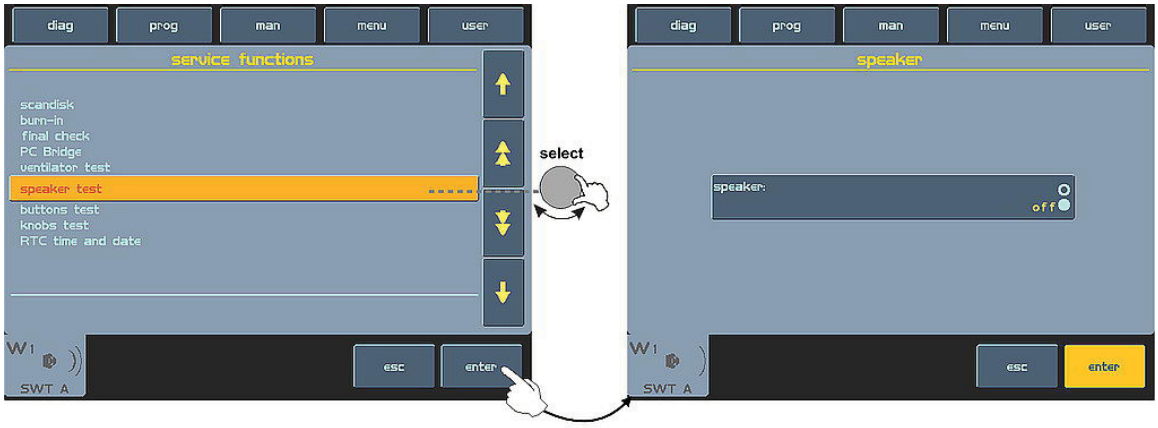
3.6.5 VENTILATOR TEST

A separate function for testing of the ventilator in the device. After pressing of this button the ventilator is switched on at full speed/switched off. The ventilator status must correspond to the indication on the display.



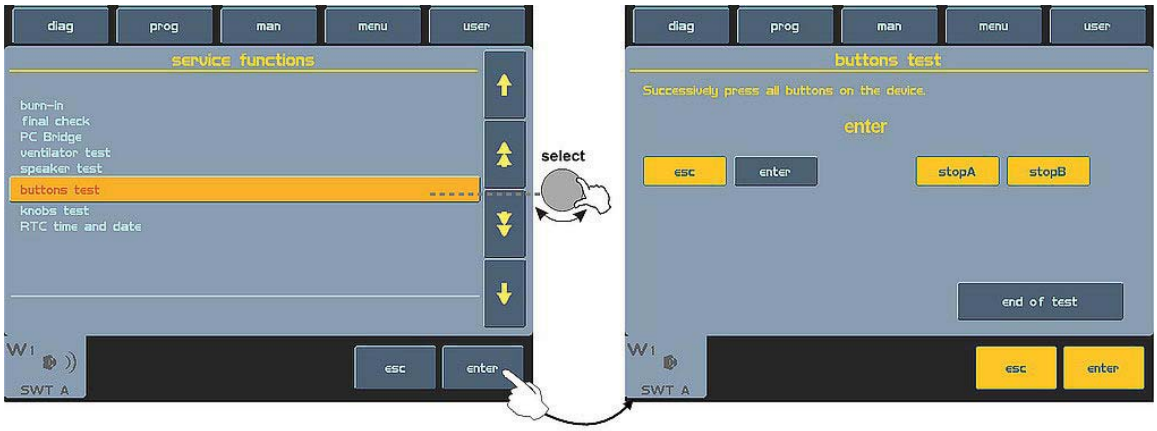
3.6.6 SPEAKER TEST

This function serves for testing of correct connection of the speaker. Pressing of this button starts/stops playing of the tune from the speaker. The playing status must correspond to the indication on the screen.



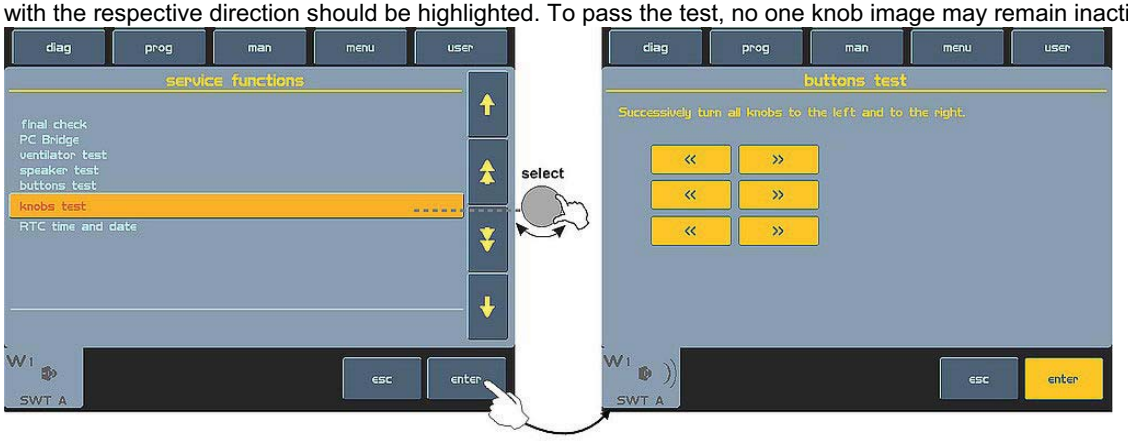
3.6.7 BUTTONS TEST

This item serves for testing of all buttons on the device. The screen displays images of all buttons of the device (including those on the knobs). After pressing a button there should appear its name and its image should be highlighted. To pass the test, no one button image may remain inactive. To end testing press the button on the screen (not the "esc" button as usually).



3.6.8 KNOBS TEST

This item serves for testing of all knobs on the device. The screen displays images of all knobs of the device. After turning a knob in one and then in the other direction there should appear the knob's name, and its image with the respective direction should be highlighted. To pass the test, no one knob image may remain inactive.



3.6.9 RTC TIME AND DATE

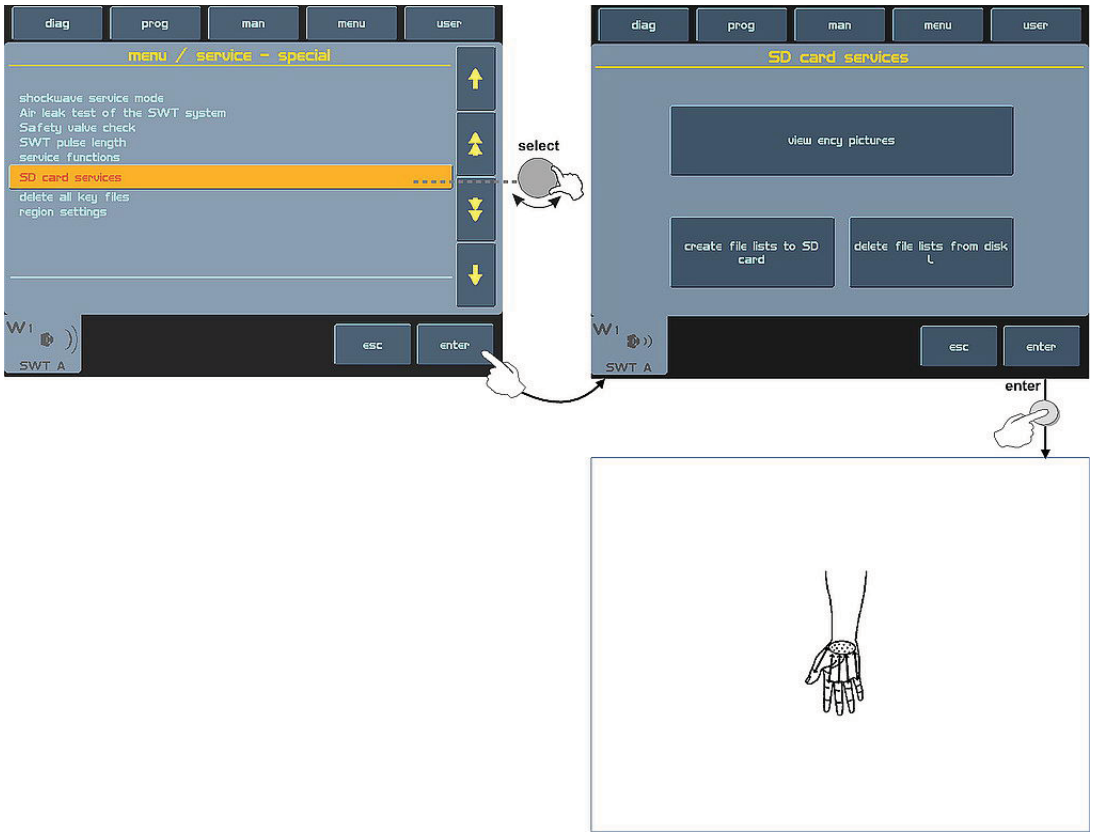
This item serves for verification of functionality of the device's real time internal clock. Similar to the function in configuration - information settings (see above).

3.7 SD CARD SERVICES

VIEW ENCY PICTURES - this items serves for browsing all pictures saved in SD card.

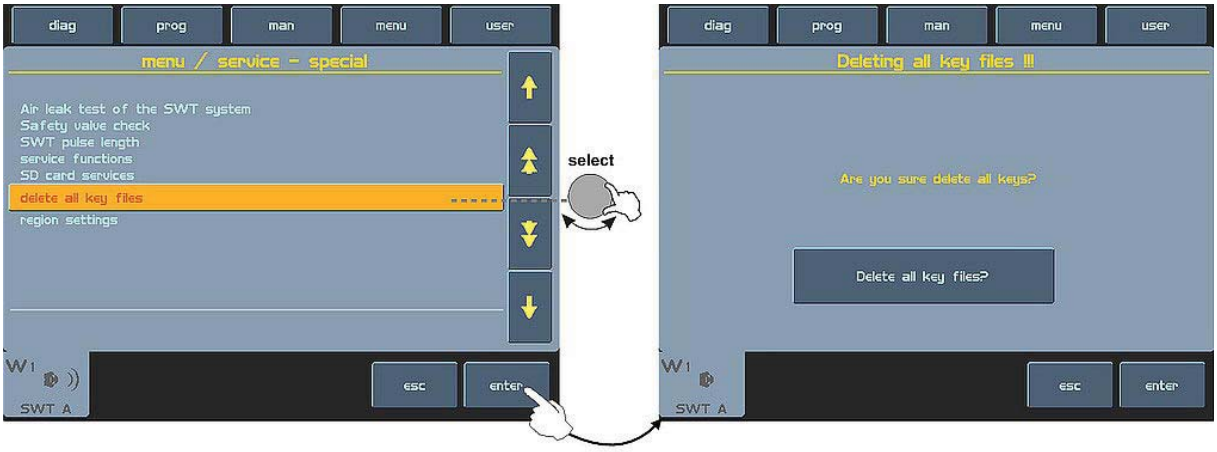
CREATE FILE LISTS TO SD CARD - function is intended **ONLY** for the production. It scans the structure of SD card, creates the list of all files on SD card and then this list saves to SD card (this list is used when the device starts).

DELETE FILE LISTS FROM DISC L - function is intended **ONLY** for the production. It deletes the file list from the disc L.



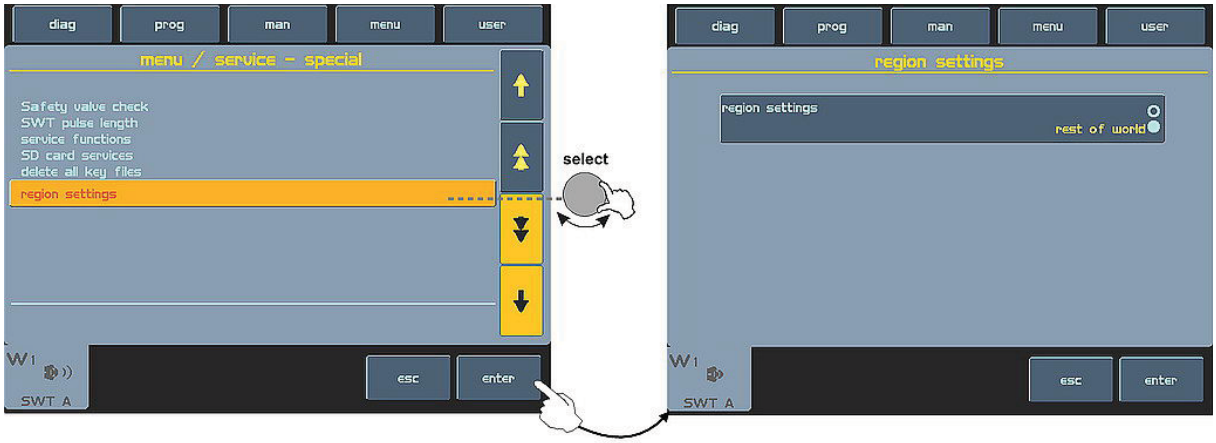
3.8 DELETE ALL KEY FILES

This function deletes all files with HW key in the device.



3.9 REGIONAL SETTING

This item presets the default setting of device from which the device is starting (US market and the rest of the world).



BTL-5000 SWT

TROUBLESHOOTING

101VS01/12/2008EN

Fault description	Checking out / Error localization	Result	Action / Remedy
After pressing the ON/OFF switch, nothing happens	is the main switch of each device in the "I" position?	no	swtch the main switch in the "I" position
	Is the compressor unit connected with the main unit by the communication cable?	no	connect the compressor unit by the communication cable with the main unit
	is the 115V/230V switch in the proper position?	no	switch the switch over to the proper position corresponding to the local mains
	are the fuses of the main unit OK?	no	replace the fuses
The applicator gives strange noise, generation of shocks is irregular	is the nut of the bumper tight?	no	tighten the nut of the bumper
	is the nut of the replacement kit tight?	no	tighten the nut of the replacement kit
		yes	replace the tube-and-roller kit
Low energy of the applied shocks at the max. setting	is the nut of the bumper tight?	no	tighten the nut of the bumper
	is the nut of the replacement kit tight?	no	tighten the nut of the replacement kit
		yes	replace the tube-and-roller kit
	is the generation of shocks irregular?	no	replace the tube-and-roller kit
Therapy cannot be started	is the applicator connected properly?	no	connect the applicator
	is the correct channel selected?	no	select the channel of the active accessories
	is there any visible damage of pins of the applicator connector?	yes	replace the applicator
The applicator does not generate shocks	is the set intensity too low?	yes	increase the intensity to the maximum
	are there leaks of the compressed air in the applicator connector?	yes	replace the applicator
	is the way of control of therapy in the Specific Settings of the unit correct?	no	correct the way of control of therapy in the Specific Settings
	the valve in the applicator responses, but shocks are generated at the maximum intensity setting?	no	replace the tube-and-roller kit
	the cumber of the shocks applied increases, but the applicator does not generate shocks	yes	replace the applicator
	does the applicator respond to pressing of the button?	yes	replace the applicator

Error code	Fault description	checking out / error localization	result	action/remedy
1400	Unexpectedly shutoff	Is the compressor unit connected with the main unit by the communication cable?	No	connect the compressor unit by the communication cable with the main unit
			Yes	restart the main unit
1402	Pressure up the system failed	Do you hear any signs of leaking the air between compressor and proportional valve?	Yes	check all pressure connections and tightness between compressor and proportional valve
		Is the compressor running?	No	check the connection of compressor
			No	replace the compressor
1403	Internal EEPROM error – counter has not been written	Is the compressor unit connected with the main unit by the communication cable?	Yes	restart the main unit
1404	Internal EEPROM error – the structure for the new tube has not been initialized			
1405	Internal EEPROM error – the configuration has not been written			
1406	Internal EEPROM error – reading configuration failed			
1407	Internal EEPROM error – reading failed			
1408	Internal voltage out of range 22V – 26V	Are connections inside the compressor unit connected properly?	No	connect all connections in the compressor unit properly
			Yes	replace the supply adapter inside the compressor unit
		Does the supply adapter, inside the compressor unit, work well. Does has the adapter output voltage 24V?	Yes	replace PCB 014-52GENPNEU
				replace PCB 014-52MAINS
1409	Difference between set pressure and output pressure of proportional valve is too high.	Do you hear any signs of leaking the air from applicator and/or connector?	Yes	replace applicator
		Do you hear any signs of leaking the air from compressor unit?	Yes	check and repair all pressure connections from proportional valve to output connector.
			No	replace the proportional valve

BTL-5000
BTL 5000 SWT
BTL-4000 Topline

Process of Upload of Application from PC by serial line - for end users

USER'S MANUAL

101z3IE28/08/2008EN

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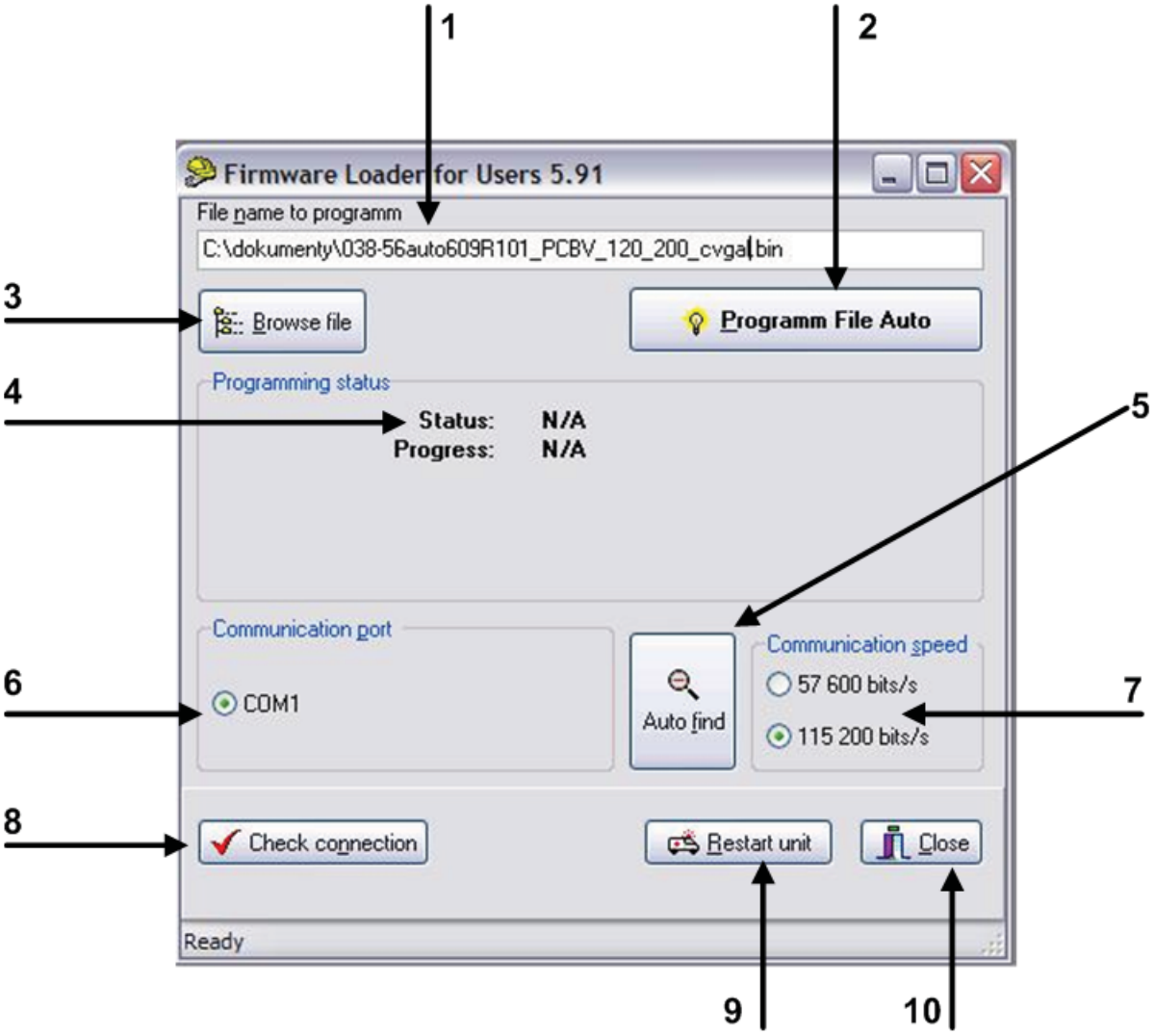
1 NEEDED EQUIPMENT AND TOOLS

- program equipment "FirmwareLoaderMini.exe" version 5.91 or higher - hereinafter "FirmwareLoader"
- serial loading cable
- PC with MS Windows operating system and a serial port (it is possible to use a USB-COM adapter)

2 CONTROLS OF FIRMWARELOADER



1	path and name of the file with new firmware	6	selection of communication port
2	button for starting of upload of new firmware	7	setting of communication speed
3	button for searching for a file with new firmware	8	button for check of correct connection of the device to PC
4	process of upload of new firmware	9	button for restart of the device
5	button for automatic searching	10	button for termination of the program FirmwareLoader

3 PROCESS OF UPLOAD

Switch the device off by the mains switch (rocker switch on the rear panel). Connect the mains cable to the device and switch on the mains switch. Then switch the device on by longer holding of the ON/OFF button on the front panel. After a while the button should light up and after releasing it the device should remain in the ON status (shining). After some 15 seconds there should appear the opening screen of the application. If the device contains the proper version of the application, do not continue. The version of the application is stated in the initial title on the start-up screen (OS SP2001, **ver XX.XX.XXXX**) or in the menu item "unit settings" – "unit information".

4 CONNECTION TO PC

Connect the loading cable to the "com out" connector on the rear panel. The other end of the cable connect to the serial port of the PC – it is also possible to use the USB-COM adapter.

Switch the device off, press simultaneously the two lower knobs (INTENSITY, TIME/STOP) and the ENTER button and, when holding them pressed, switch the device on. The display should remain dark and after a while (approx. 10 seconds) the device should play a short tune – then you can release the buttons. Now the device is in the mode for upload of firmware by external serial line.

Start the "FirmwareLoader" program on the PC.

We recommend setting the communication speed to 115200 bit/s (7).

Set the correct communication port (6) and communication speed (7). It is possible to use the "Auto find" function (5) which will try to find the device in all available serial ports.

(Note: In some types of computer this function may not work reliably.)

Check the connection with the device by the "Check connection" button (8). If everything works OK, the dialog box with the message "Unit present" must appear after pressing this button. If there appears the message "Unit not found", the computer cannot connect to the device for a reason – it is necessary to find out why, try to repeat the previous steps with other communication speed, check the cable, etc.

Note:

If the program does not find the device on the first try, it is suitable to press the "Check connection" button (8) for several more times, the device could respond later.

5 LOADING OF FIRMWARE

!!! ATTENTION !!!

Loading of firmware is a very delicate process which under certain conditions can disable work with the device. The loading program is designed to minimize the possibility of an error; however, some risk still remains. Therefore it is recommended that you have some experience with computers before performing this action.

Do not switch the device and/or the PC during loading – incorrectly loaded firmware could cause locking of the device (this status could require even a servicing intervention of the manufacturer).

During loading do not move the window with the running application in the Windows environment, otherwise there is a risk of a programming error – in such case restart programming.

Press the "Browse file" button (3) with a directory tree symbol to select the file with the application to be loaded to the device. The selected file is displayed in the upper field (1). The program remembers the last setting.

Press the "Program file auto" button (2) to start loading of the program to the device. First there is detected configuration of the device and consistency of the loaded file. This part is indicated by the message "Reading unit information…" (4). If any incompatibilities or other problems are found, there appears an error message with the description of the error. These errors are usually caused by incorrect or corrupted input file – in such case it is necessary to get a new file.

After this testing the process of loading is started – it is indicated by the message "Programming…" (4). If any problem appears during programming, an error message is displayed. During loading the program informs about the current percentage status of completion. If an error occurs during programming, do not switch the device off and restart programming. If the error repeats, contact the service department.

If programming passed OK, there appears the dialog box "Complete OK". Now you can reset and disconnect the device.

6 RESET AND DISCONNECTION OF THE DEVICE

If this work with the device is complete, disconnect it by pressing the "Restart unit" button (9). The device first restarts and then the PC disconnects from it. After restart of the device there should appear the standard opening screen of the application and it is possible to standardly work with the device. To check that the new version of firmware is loaded in the device, see the "unit information" menu item.

BTL-5000
BTL 5000 SWT
BTL-4000 Topline

Process of Upload - for service

USER'S MANUAL

101z3IE04/08/2008EN

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1 PROCESS OF UPLOAD OF APPLICATION FROM PC BY SERIAL LINE - FOR SERVICE

Application shall be loaded into the assembled equipment containing an application or the program loader.

2 NEEDED EQUIPMENT AND TOOLS

- program equipment "FirmwareLoaderService.exe" version 3.02 or higher - hereinafter "FirmwareLoader"
- serial loading cable
- PC with operating system and a COM port (it is possible to use a USB-COM adapter)

3 CONNECTION TO PC

Switch the device off, press simultaneously the two lower knobs (INTENSITY, TIME/START/STOP) and the ENTER button and, when holding them pressed, switch the device on. The display should remain dark and after a while (approx. 10 seconds) the device should play a short tune. If so, the device is in the mode for upload of firmware by external serial line.

Connect the loading cable to the "com out" connector on the rear panel. The other end of the cable connect to the serial port of the PC – it is also possible to use the USB-COM adapter.

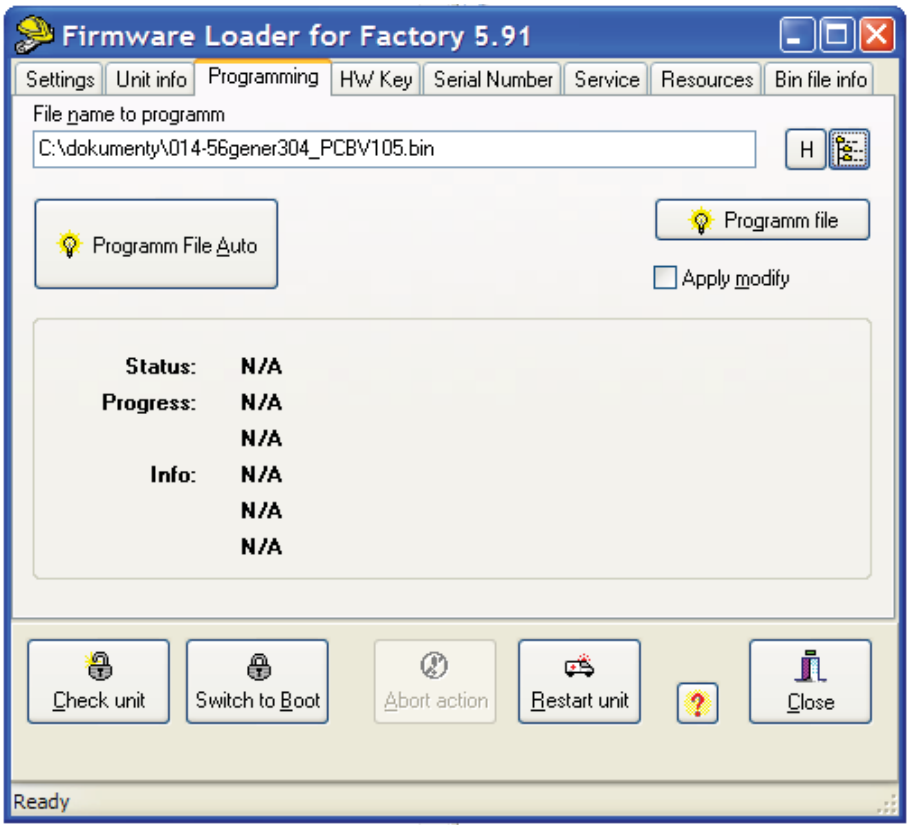
Start the "FirmwareLoader.exe" program on the PC.

We recommend setting the communication speed to 115200 bit/s.

The version of the loader can be found out after loading of HW Info (see below). If you are not sure you can leave this item checked off, the loading will work even with the new devices, but it will be slower.

Set the proper communication port ("Settings" tab) and communication rate. It is possible to use the "Auto find" function which will try to find the device in all available serial ports (only the ports really connected to the computer are displayed).

To check the connection with the device at any time press the "Check connection" button in the program. If everything works OK, the dialog box with the message "Unit present" must appear then.
If there appears the message "Unit not found", the computer cannot connect to the device for a reason – it is necessary to find out why, try to repeat the previous steps with other communication rate, check the cable, etc.



The version of the loader can be found out after loading of HW Info (see below). If you are not sure you can leave this item checked off, the loading will work even with the new devices, but it will be slower.

Set the proper communication port ("Settings" tab) and communication rate. It is possible to use the "Auto find" function which will try to find the device in all available serial ports (only the ports really connected to the computer are displayed).

To check the connection with the device at any time press the "Check connection" button in the program. If everything works OK, the dialog box with the message "Unit present" must appear then.

If there appears the message "Unit not found", the computer cannot connect to the device for a reason – it is necessary to find out why, try to repeat the previous steps with other communication rate, check the cable, etc.

4 UNIT HW INFO

Switch over to the "Unit info" tab and press the "Reload" button in the upper left corner of the window. The percentage status of communication should appear at the bottom of the window. After a while a table in the program should list the hardware configuration of the tested device. On the "Unit info" tab you can see the hardware configuration of the device. The key data are especially the version of the loader and the versions of particular printed circuits in the equipment. Unit info can be updated (reloaded from the device) at any time by pressing the "Reload" button.

5 LOADING OF FIRMWARE

If the information in the Unit info is correct it is possible to start loading of firmware. Switch to the "Programming" tab.

Press the button with a directory tree symbol to select the file with the application to be loaded to the device (300-56autoXXX_C.bin or 300-56autoXXX_BW.bin). The selected file is displayed in the upper field. The program remembers the last setting.

Press the "Program file auto" button to start the procedure which compares the selected file with data from the device – if the device is compatible, this procedure modifies the loaded file according to parameters read from the device and starts loading of the program to the device. If any problem occurs, there appears an error message with possible description of the error. During loading the program informs about the current percentage status of completion.

If programming passed OK, there appears the dialog box "Complete OK". Now you can reset and disconnect the device.

To abort programming press the "Abort action" button. However, after starting a device with incompletely loaded firmware there is a risk of its failure.

6 RESET AND DISCONNECTION OF THE DEVICE

If this work with the device is complete, disconnect it by pressing the "Restart unit" button. The device first restarts itself and then the PC disconnects from it.

7 APPENDIX - SUPPLEMENTARY DESCRIPTION AND EXPLANATION

Loading is completely automatic, i.e. it is not necessary to check the versions in the device and the loaded file. The program automatically modifies itself according to the parameters read from the device – i.e., if the program finds out that the device contains another type of hardware than is set in the loaded file, the loaded file is internally modified before loading so that it corresponds to the configuration of the device. The exception is files for colour and b/w device which are so much different that they cannot be mutually substituted and modified. This automatic control is fully functional if there have not been any major hardware changes in the device. If there have been such changes, it is necessary to load the correct new configuration (i.e. file with the correct new hardware configuration) at least once to the device. A typical example is replacement of the supply part in physiotherapy devices by a more powerful one: in such case it is not possible to load the universal file to the device as usually, but at the first loading after the replacement it is necessary to load to the device a specific file containing this change. Next loading works standardly with the automatic configuration.

It is possible to upload to several devices at the same time – their number is limited only by the number of COM ports on the PC. Each of these devices has its own FirmwareLoader session running.

During loading do not move the window with the running application in the Windows environment, otherwise there is a risk of a programming error – in such case restart programming.

BTL-5000 SWT
Service process of the upload of application in the SWT compressor unit from PC via the serial line

USER'S MANUAL

100IE04/08/2008EN

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7 APPENDIX - SUPPLEMENTARY DESCRIPTION AND EXPLANATION 6

1 GENERAL INFORMATION

Application shall be loaded into the assembled equipment containing an application or the program loader.

2 NEEDED EQUIPMENT AND TOOLS

- program equipment "FirmwareLoaderService.exe" version 5.91 or higher - hereinafter "FirmwareLoader"
- PC with operating system and a USB port
- USB-COM BTL adapter
- serial upload cable for SWT

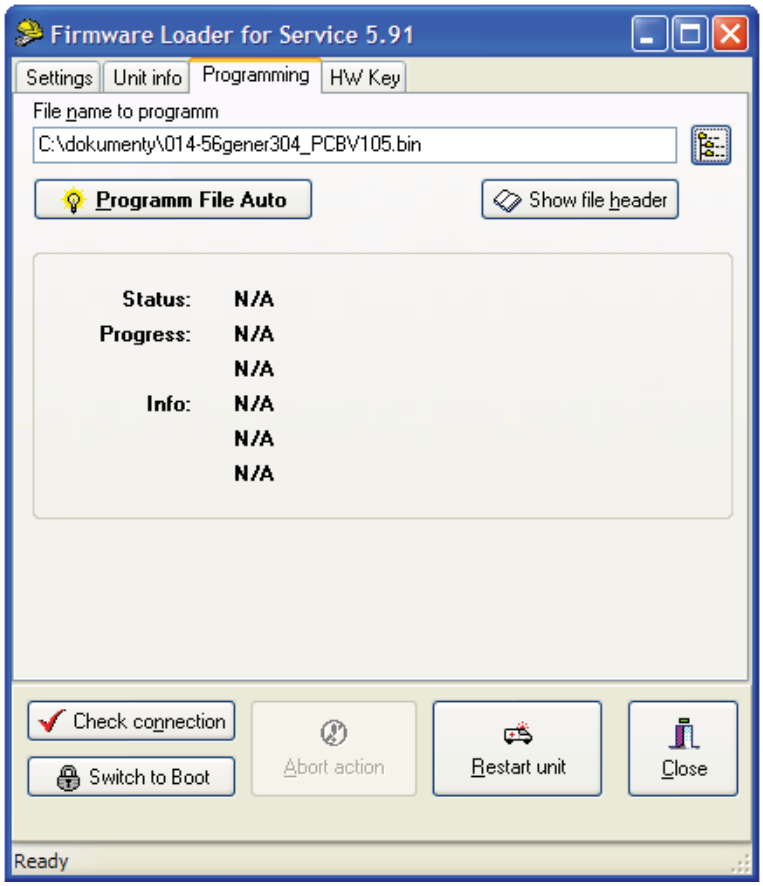
3 CONNECTION TO PC

Switch off the compressor unit device and disconnect it from the main unit.

Connect the serial upload cable with the USB-COM adapter cable and plug the red end in the compressor unit and the black end in the PC USB port.

Start the "FirmwareLoader.exe" program on the PC. We recommend setting the communication speed to 115200 bit/s.

Press the “Switch to Boot” button and switch on the compressor unit. After a while the PC connects with the compressor unit and the system is ready.



The version of the loader can be found out after loading of HW Info (see below). If you are not sure you can leave this item checked off, the loading will work even with the new devices, but it will be slower.

Set the proper communication port ("Settings" tab) and communication rate. It is possible to use the "Auto find" function which will try to find the device in all available serial ports (only the ports really connected to the computer are displayed).

To check the connection with the device at any time press the "Check connection" button in the program. If everything works OK, the dialog box with the message "Unit present" must appear then.

If there appears the message "Unit not found", the computer cannot connect to the device for a reason – it is necessary to find out why, try to repeat the previous steps with other communication rate, check the cable, etc.

4 UNIT HW INFO

Switch over to the "Unit info" tab and press the "Reload" button in the upper left corner of the window. The percentage status of communication should appear at the bottom of the window. After a while a table in the program should list the hardware configuration of the tested device.

On the "Unit info" tab you can see the hardware configuration of the device. The key data are especially the version of the loader and the versions of particular printed circuits in the equipment. Unit info can be updated (reloaded from the device) at any time by pressing the "Reload" button.

5 LOADING OF FIRMWARE

If the information in the Unit info is correct it is possible to start loading of firmware. Switch to the "Programming" tab. Press the button with a directory tree symbol to select the file with the application to be loaded to the device (014-56generXXX_PCBVXXX.bin). The selected file is displayed in the upper field. The program remembers the last setting.

Press the "Program file auto" button to start the procedure which compares the selected file with data from the device – if the device is compatible, this procedure modifies the loaded file according to parameters read from the device and starts loading of the program to the device. If any problem occurs, there appears an error message with possible description of the error. During loading the program informs about the current percentage status of completion.

If programming passed OK, there appears the dialog box "Complete OK". Now you can reset and disconnect the device.

To abort programming press the "Abort action" button. However, after starting a device with incompletely loaded firmware there is a risk of its failure.

6 RESET AND DISCONNECTION OF THE DEVICE

If this work with the device is complete, disconnect it by pressing the "Restart unit" button. The device first restarts itself and then the PC disconnects from it.

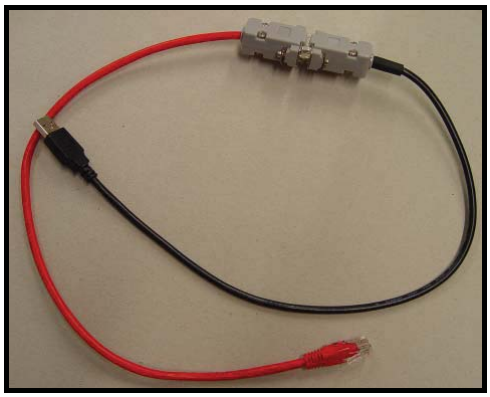
7 APPENDIX - SUPPLEMENTARY DESCRIPTION AND EXPLANATION

Loading is completely automatic, i.e. it is not necessary to check the versions in the device and the loaded file. The program automatically modifies itself according to the parameters read from the device – i.e., if the program finds out that the device contains another type of hardware than is set in the loaded file, the loaded file is internally modified before loading so that it corresponds to the configuration of the device. The exception is files for colour and b/w device which are so much different that they cannot be mutually substituted and modified. This automatic control is fully functional if there have not been any major hardware changes in the device. If there have been such changes, it is necessary to load the correct new configuration (i.e. file with the correct new hardware configuration) at least once to the device. A typical example is replacement of the supply part in physiotherapy devices by a more powerful one: in such case it is not possible to load the universal file to the device as usually, but at the first loading after the replacement it is necessary to load to the device a specific file containing this change. Next loading works standardly with the automatic configuration.

It is possible to upload to several devices at the same time – their number is limited only by the number of COM ports on the PC. Each of these devices has its own Firmware Loader session running.

During loading do not move the window with the running application in the Windows environment, otherwise there is a risk of a programming error – in such case restart programming

Picture of the upload cable of the compressor unit connected with the USB-COM adapter.



Test Protocol

1. **Type of device:** **BTL SWT BASIC** ☐ **BTL SWT POWER** ☐
BTL SWT ESTIM ☐ **BTL EAT** ☐
BTL AWT BASIC ☐ **BTL AWT POWER** ☐
BTL AWT ESTIM ☐

2. **Serial number:** .....

3. **Used equipment:** 2 pcs. of 114-guntxxx reg.nos.:.....
HV supply V199-VNZDROJ100 reg.no.:.....
test device TK01 (Meditest) reg.no.:.....Multimeter TM03 reg. no.....
Cable 270-232_USB100z2 reg. no.....Cable 214-55load100 reg. no.....
Touch memory porgramming device reg. no. .....
Other: .....

4. **Measuring conditions:** ambient temperature: .....°C
Atmospheric pressure.....Bar
mains voltage (215 to 240 V).....V

5. **Burn-in of device:** Time of burn-in: .....hrs. Burn-in OK: ..... ☐ **Yes** ☐ **No**
6. **Appearance check – OK**..... ☐ **Yes** ☐ **No**
7. **The device does not clatter when tilt**..... ☐ **Yes** ☐ **No**
8. **Type, manufacture and safety labels are properly sticked-on**..... ☐ **Yes** ☐ **No**
9. **Voltage switch 115V/230V is in position by order (115 or 230V)**..... ☐ **Yes** ☐ **No**
10. **The fuse box contains the proper fuse**..... ☐ **Yes** ☐ **No**
11. **Check of leakage currents according to OTP-126**
    a) leakage current **mains – functional earthing of device** (less than 900μA –Single fault condition, less than 450 μA –Normal condition): .....Single fault condition..... μA
    ....Normal condition.....μA
    b) leakage current **mains – box frame + communication + footswitch + pacient part + Ein+Eout** (less than 200μA –Single fault condition, less than 90 μA – Normal condition):
    ..... Single fault condition..... μA
    .....Normal condition.....μA
    c) leakage current **box frame** - **communication** + **footswitch + patient part + Ein+Eout** (less than 90 μA):..... μA
    d) leakage current **communication** - **footswitch + patient part + Ein+Eout** (less than 90 μA): ..... μA
    e) leakage current **footswitch - patient part + Ein+Eout** (less than 90 μA): ..... μA
12. **Check of insulation barriers according to OTP-260**
    a) Insulation barrier **patient part - Ein+Eout** (more than 19,99 MΩ)..... ☐ Yes ☐ No
    b) Insulation between **patient part A** and **patient part B** (more than 19,99 MΩ)..... ☐ Yes ☐ No
13. **Check of insulation barriers according to OTP-124**
    a) insulation barrier **mains – functional earthing of device** (1 800 V; max. 5 μA)..... μA
    b) insulation barrier **box frame – mains + communication + footswitch + patient part + Ein+Eout** (4 800 V; max. 5 μA) .....μA
    c) insulation barrier **mains – communication + footswitch + pacient part + Ein+Eout** (4 800 V; max. 5 μA.....μA
    d) insulation barrier **communication** - **footswitch + patient part + Ein+Eout** (4 800 V; max. 5 μA)..... μA
    e) insulation barrier **footswitch - patient part + Ein+Eout** (4 800 V; max. 5 μA)..... μA
14. **Check of proper communication with PC (**firmware loader**)**..... ☐ Yes ☐ No
15. **Therapy check**
    a) Check output pressure of Shockwave (channel A) : (from 2.3 to 2.7 Bar)..... Bar
    b) Check output pressure of Shockwave (channel B) : (from 2.3 to 2.7 Bar)..... Bar
    c) Check shooting of applicator valve with shooting frequency (10 Hz)..... ☐ Yes ☐ No
    d) Check fans..... ☐ Yes ☐ No
    e) Check, that LEDs are shining properly..... ☐ Yes ☐ No
    f) Check of footswitch..... ☐ Yes ☐ No
    g) Check safety switch off valve..... ☐ Yes ☐ No
    h) Ein, Eout check..... ☐ Yes ☐ No
    i) Check safety valve..... ☐ Yes ☐ No

16. Tightness check

a) Pressure decrease during first test (less than 0.5 Bar):.....Bar
b) Reach of upper pressure limit (less than 25 sec):..... sec
c) Pressure decrease during second test (less than 0.8 Bar):.....Bar
d) Pressure decrease during third test (less than 0.8 Bar):..... Bar

17. EEPROM content check..... ☐ Yes ☐ No
18. Reset statistics counter..... ☐ Yes ☐ No
19. Check cleanness again..... ☐ Yes ☐ No

Date: ..... **Signature:** .....

20. Packaging, completing

Date: ..... **Signature:** .....

Notes to the Report

ad 1. Check the type of the device.
ad 2. Stated on the manufacture label – write it down.
ad 3. List of used equipment; for possible later check; write down their registration numbers. 114-gunt100 = testing applicator with manometer.
ad 4. Here state the measuring conditions – temperature, atmospheric pressur in the room and voltage in the mains.
ad 5. Minimum time of burn-in is 4 hours. Temperature in the room during burn-in must be at least 23°C. Connect 114-gunt100 to patient connector A. Switch the device to the burn-in mode: **service mode – menu – service functions - special – service functions – burn-in**.
ad 6. Check if the surface of the device is not scratched; check if all parts match; if all letterings on the device are readable; if connectors are properly mounted and do not slip; if all bolts are tight. Check that on bottom of box are prepared four holes, containing thread, for silentblocks. Check, that tube draining condensate from SWT box is properly sticked into plastic bottle at the bottom of rear side of SWT box.
ad 7. Take the completely assembled device and tilt it to all sides. It must not make any noise suggesting that some part or some screw or bolt can be freed.
ad 8. Check if the type label and serial number are stuck on proper place - at the right bottom area of the rear panel.
ad 9. The voltage switch is at the rear panel of the device. Switch it to 230V, if the device is shipped to the country with 230V supply. If it will be delivered to country with 115V supply, switch it to 115V position.
ad 10. The fuse box is on the rear panel of the device – check if the box contains the fuse of the same type as stated by label above the fuse box.
ad 11. Proceed as follows:

a) Measure according to picture 1 – see attachment. The upper switch of the "Meditest" device is in position "**Unikající proud / Leakage current**". Measure in position "**Síť - Přístupná část / Mains – Accessible Part**"- **indirect**, of the lower switch. Write down measured value. The maximum permissible value of the measured current is **900 μA** (single fault condition = indirect methode). Measure in positions "**Síť - Přístupná část / Mains – Accessible Part** " - **direct and differential**, of the lower switch. Write down the worst measured value. The maximum permissible value of the measured current is **450 μA** (normal condition = direct methode and differential methode).
b) Measure according to picture 2 – see attachment. The upper switch of the "Meditest" device is in position "**Unikající proud / Leakage current**". Measure in position "**Síť - Příložná část / MAINS – Applied Part** " - **Indirect** of the lower switch. Write down measured value. The maximum permissible value of the measured current is **200 μA** (single fault condition –standard requires less than **450 μA**). Measure in position "**Síť - Příložná část / MAINS – Applied Part** " - **direct** of the lower switch. Write down measured value. The maximum permissible value of the measured current is **90 μA** (normal condition)
c) Measure according to picture 3 – see attachment. The upper switch of the "Meditest" device is in position "**Unikající proud / Leakage current**". Measure in position "**Příložná část - Přístupná část / Applied part – Accessible Part** " of the lower switch. Write down measured value. The maximum permissible value of the measured current is **90 μA**.
d) Measure according to picture 4 – see attachment. The upper switch of the "Meditest" device is in position "**Unikající proud / Leakage current**". Measure in position "**Příložná část - Přístupná část / Applied part – Accessible Part** " of the lower switch. Write down measured value. The maximum permissible value of the measured current is **90 μA**.
e) Measure according to picture 5 – see attachment. The upper switch of the "Meditest" device is in position "**Unikající proud / Leakage current**". Measure in position "**Příložná část - Přístupná část / Applied part – Accessible Part** " of the lower switch. Write down measured value. The maximum permissible value of the measured current is **90 μA**.

ad 12. Measuring according to OTP-260. The upper switch of the "Meditest" device is in position "**Izolační odpor / Insulation Resistance**", position of the lower switch does not matter. The minimum permissible value of the measured resistance is higher than 19.99 MΩ, the device displays (1 .).

a) Connect device according to picture 6 from attachment and perform measurement.
b) Connect device according to picture 7 from attachment and perform measurement.

ad 13. Process of measuring:

a) Connect according to picture 8 – see attachment. Set the test voltage to **1 800 V**. Start generation of the test voltage. Wait until the values on the display are steady. Write down the measured value. The maximum permissible value of the measured current is **5 μA**.
b) Connect according to picture 9 – see attachment. Assure, that box is placed on nonconductive pad. Set the test voltage to **4 800 V**. Start generation of the test voltage. Wait until the values on the display are steady. Write down the measured value. The maximum permissible value of the measured current is **5 μA**. **Be cautious, there is 4800V applied to box frame. Assure that nobody touches it!!!**
c) Connect according to picture 10 – see attachment. Set the test voltage to **4 800 V**. Start generation of the test voltage. Wait until the values on the display are steady. Write down the measured value. The maximum permissible value of the measured current is **5 μA**.

d) Connect according to picture 11 – see attachment. Set the test voltage to **4 800 V**. Start generation of the test voltage. Wait until the values on the display are steady. Write down the measured value. The maximum permissible value of the measured current is **5 μA**.
e) Connect according to picture 12 – see attachment. Set the test voltage to **4 800 V**. Start generation of the test voltage. Wait until the values on the display are steady. Write down the measured value. The maximum permissible value of the measured current is **5 μA**.

ad 14. Connect proper communication cable (270-232_USB100z2 and 214-55load100) to communication connector placed at rear side of Shockwave. Stick „touch pen" into small hole beside communication connector and press button inside and than Turn the power of Shockwave ON. Open Firmware loader on your PC. Try connection between PC and Shockwave. Then load appropriate version of firmware and correct serial number into Shockwave.

ad 15.

Start BTL5000 in normal mode. Connect to patient connector A test simulator of SWT applicator with manometer 114-gunt100. On "program" screen start therapy w-01 00 (continual shooting, frequency 10Hz, pressure 2.5 Bars).

a) Check pressure on barometer and write value.
b) Repeat procedure with simulator of applicator (114-gunt100) connected to output B.
c) Check, that frequency conforms to set parameter.
d) Check, that fans in Shockwave box start to blow, when therapy is launched.
e) Check correct LED's shining, it should be as follows: when SWT is on, LED „Power" is shining, if channel A is active, then „out A" LED is shining, if channel B is active, then „out B" LED is shining. When therapy is started, LED „ready" is shining.
f) Connect footswitch to proper connector, set footswitch therapy control (***menu/specific settings/shockwave settings/therapy control***), check footswitch function and set again therapy control by applicator.
g) Check proper function of „Safety Switch off valve" by following procedure. Plug applicator simulator to output A, start therapy and during therapy turn Shockwave power switch OFF. Air must remain in Shockwave box, it must not blow off from box with loud noise.
h) Check E-stim functionality by following procedure: Restart device in service regime. Enter Shockwave service mode. Press button „SWT –Electro" and check conductivity between connectors Ein and Eout (pins 1, 3, 4, 5, 7). Check also conductivity between pin 2 of connector Ein and pink lead of fake applicator 114-guntxxx (signal E-GENER). Switch button "SWT-Electro" off and check that path between pin 2 of connector Ein and pink lead of fake applicator is not conductive. Connect device for programming touch memory to connector Ein and check proper reading of touch memory content into PC (there must be proper data for E-stim present in touch memory).
i) In service mode -***Service functions special*** launch ***Safety valve check*** and check, that pressure in system before compressor stops, is less then 8,4 Bar and within 10 seconds after compressor stops this pressure is less than 8 Bar.

ad 16. Stay in service mode. Blow off air from air tank (Enter ***menu / Service functions special /Shockwave service mode,*** press „E/P valve test" and use blow off button on fake applicator 114-guntxxx). Enter ***menu / Service functions special / air leak test of the SWT system*** and follow instructions on display.

a) The pressure decrease during first test can not be higher than 0.5 Bar. Blow off air, so that pressure falls bellow 1,5 Bar.
b) After blow off should system reach upper hysteresis limit within 25 seconds.
c) The pressure decrease during second test can not be higher than 0.8 Bar.
d) For third test stick applicator to connector B. The pressure decrease during third test can not be higher than 0.8 Bar.

ad 17. Stay in service regime and check that EEPROM configuration data are correct (***menu - servis functions extra-shockwave eeprom***). It should be set as follows:

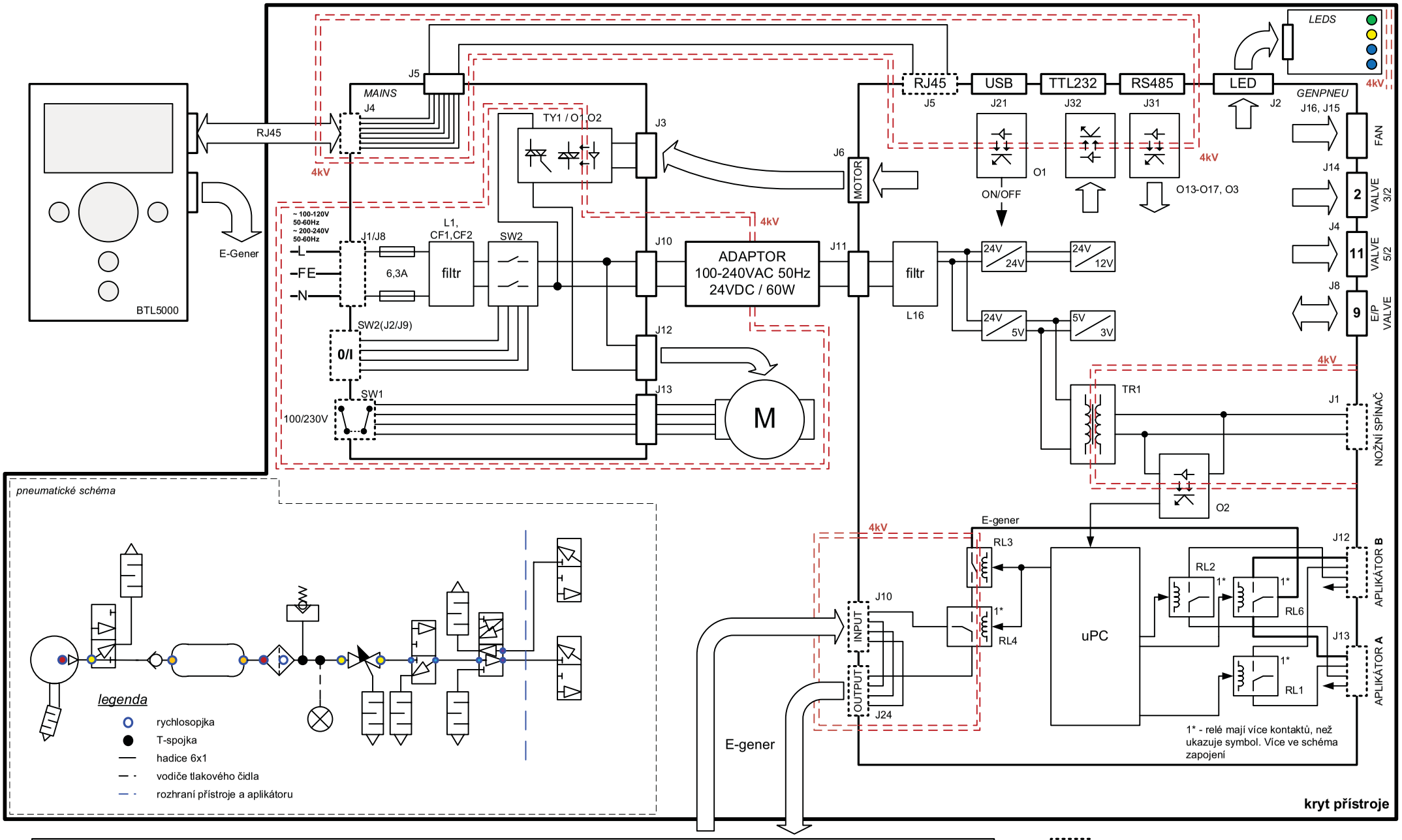
Type of compressor	1 or 2
Air tank volume	750 or 900ml
Max. therapy pressure	5000mBar
Max. shots frequency	22Hz
Min air tank pressure	6000mBar
Max. air tank pressure	7000mBar
Max. system pressure	7500mBar
Compressor starting delay	500ms

Last four items are OK, if system has passed therapy check.

ad 18. Stay in service regime, enter ***menu / service –special / shockwave statistics***, hit button ***options*** and choose ***clear all statistics*** option.

BTL-5000 SWT Series

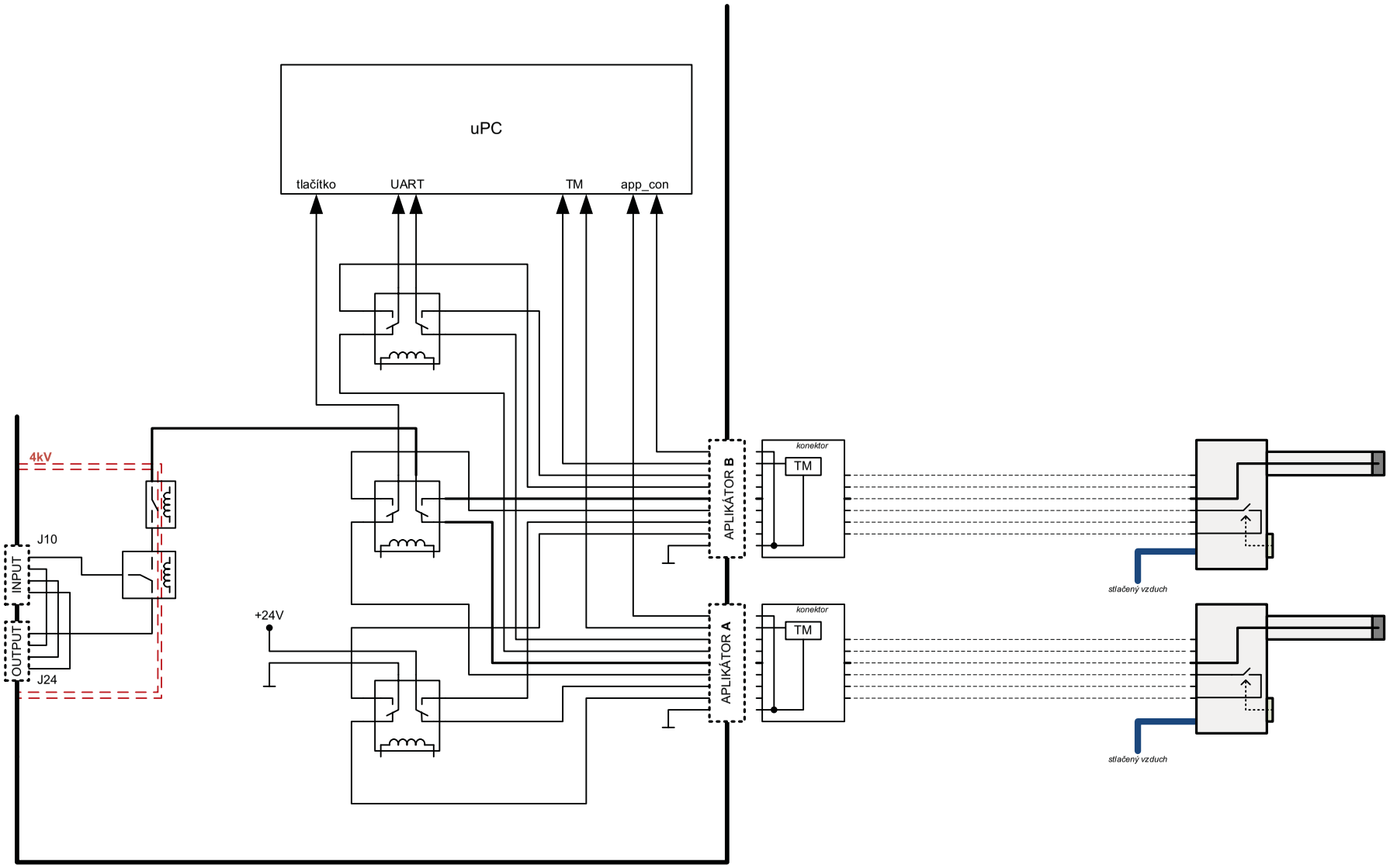
BLOCK DIAGRAM



Popis: Description:	Blokové schéma se zaměřením na izolační bariéry		
Medical Technologies	Název projektu: Project name:	BTL-Shockwave	
	Kreslil: Designed by:	VS16/11/2007	List: Sheet: 1 of 2
	Schválil: Approved by:	VS16/11/2007	Číslo výkresu: Sheet number: **014-54shockwaveEZU102.vsd**

konektory mající vývod ven z přístroje

barijéry



Popis: Description:	Blokové schéma připojení aplikátoru		
Medical Technologies	Název projektu: Project name: BTL-Shockwave		
	Kreslil: Designed by: VS16/11/2007	List: Sheet: 2 of 2	
	Schválil: Approved by: VS16/11/2007	Číslo výkresu: Sheet number: **014-54shockwaveEZU102.vsd**	

BTL-5000 SWT Series

CABLE DRAWINGS

CONTENT

1 014-5501POW4W100.....1

2 014-5502SPEAK2W100.....2

3 014-5503POW2W100.....3

4 014-5504COM14W102.....4

5 014-5505CONTROL2W100.....5

6 014-5506LINK8W100.....6

7 014-5508PAC7W100.....7

8 014-5509PAC2W100.....8

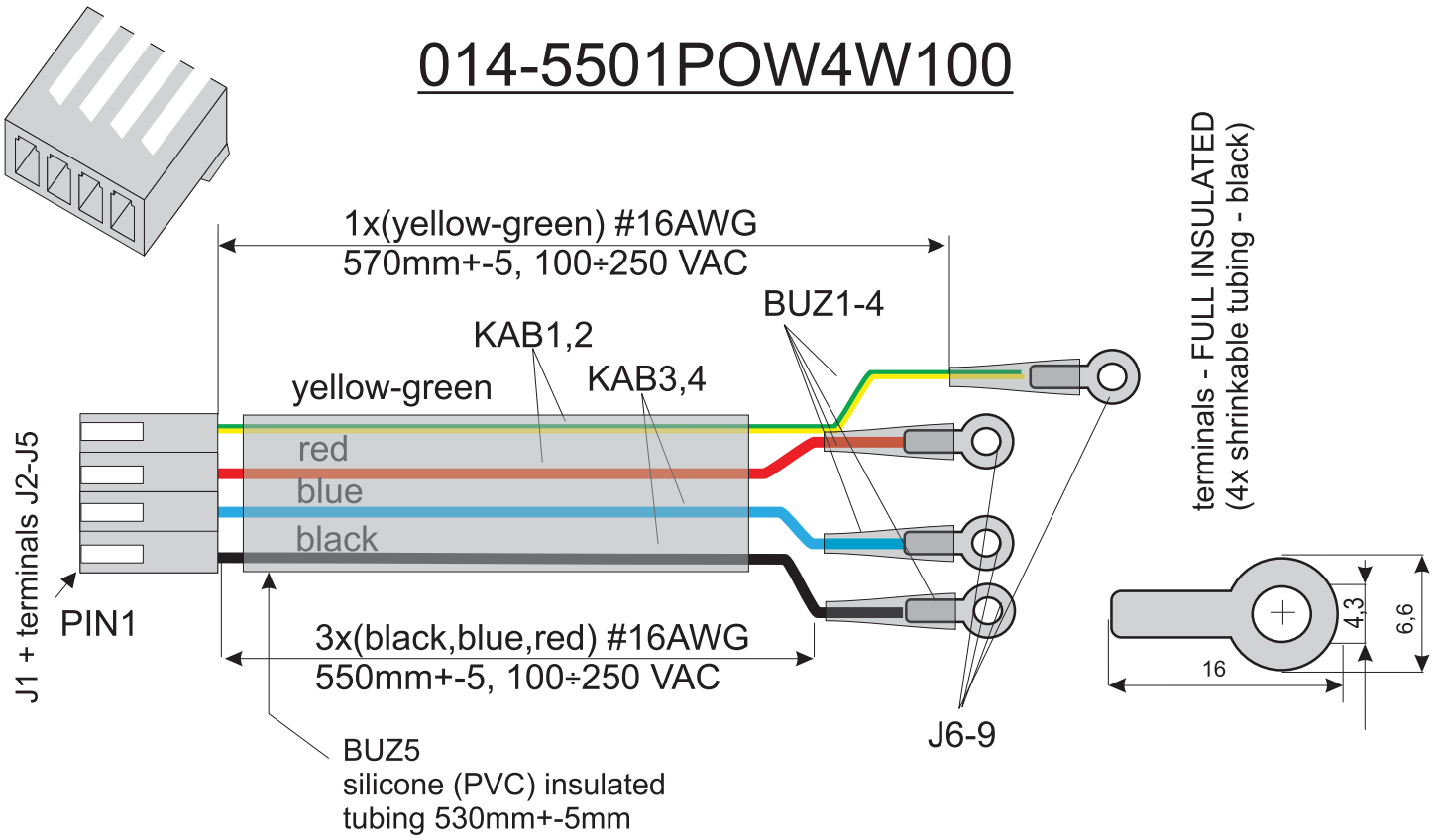
9 014-5510CONTROL2W100.....10

10 014-5511EARTH1W100.....11

11 014-5512DETECT2W100.....12

12 014-5513POW6W100 13

014-5501POW4W100



PIN	WIRE COLOR	MOTOR LINK
1	black	U2
2	blue	V1
3	red	V2
4	yellow-green	PE

Connectors:

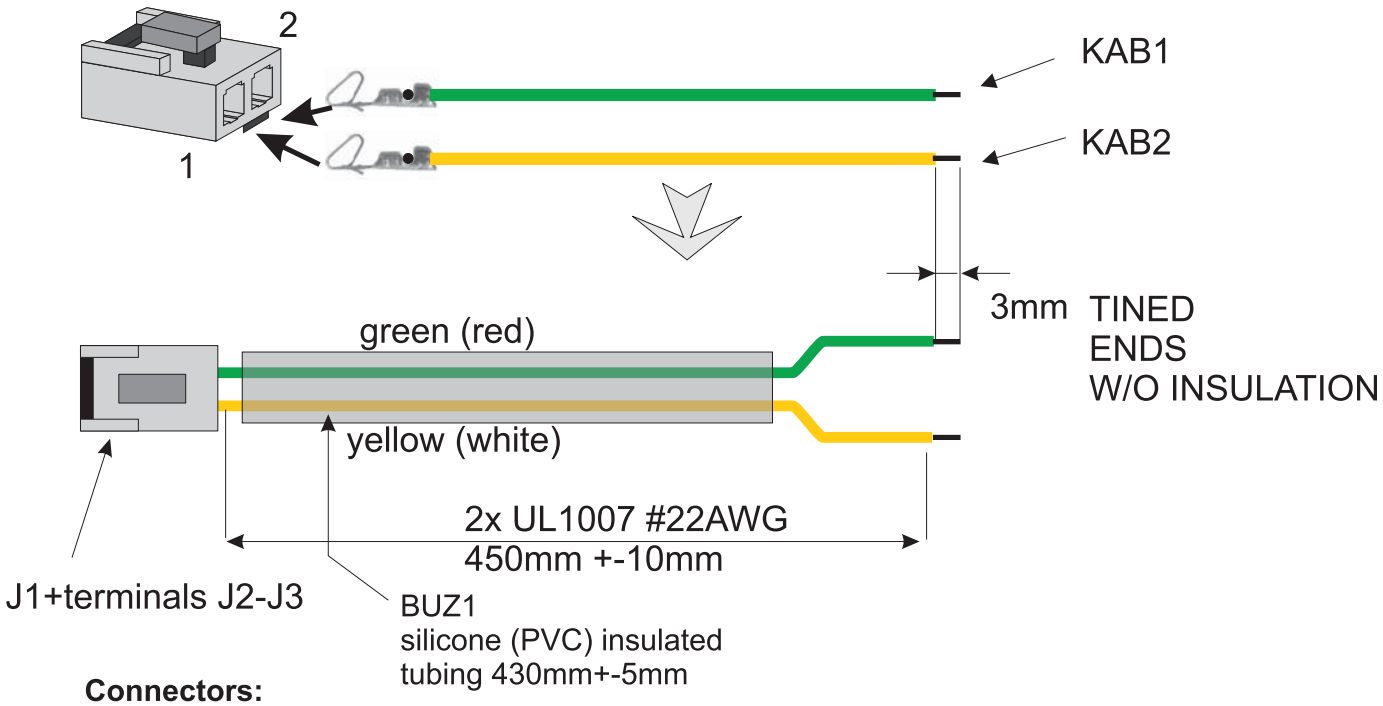
Description	Reference	Molex	JST	AVA
Housing - 5,08 Pitch terminals	J1 J2-5	5058-N (o.n. 10-01-5042) 5168 (5167)	VBR-4 SVH-21T-P1.1	4300-4P-V 8400-T (TA)
Mating products		5281-NA	B2P-VB-4	4400-4P

Quick connect Female Receptable	J6-J9			
Mating products				

Změna: Change No.:	Popis změny: Change description:	Kreslil: Drawn by:	Konstruoval: Designed by:	Schválil: Approved by:	Pův. verze: Previous ver.:
z4	**correction of yellow wire on ground wire**	**PL17/04/2008**	**PL17/04/2008**	**TN17/04/2008**	**100z3**
z3	**correction of color wire**	**PL27/02/2008**	**PL27/02/2008**	**TN27/02/2008**	**100z2**
z2	**length change**	**PL26/11/2007**	**PL26/11/2007**	**TN26/11/2007**	**100z1**
z1	**change of cable AWG**	**PL12/11/2007**	**PL12/11/2007**	**TN12/11/2007**	**100**

Název výrobku: Product name: **supply cable POWER**				
BTL Medical Technologies	Kreslil: Drown by: **PL30/10/2007**	Materiál: Material:		
	Konstr.: Designed by: **PL30/10/2007**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN30/10/2007**	List: Sheet: **1** z of **1**	Číslo výkresu: Sheet number:	**014-5501pow4w100z4**

014-5502SPEAK2W100

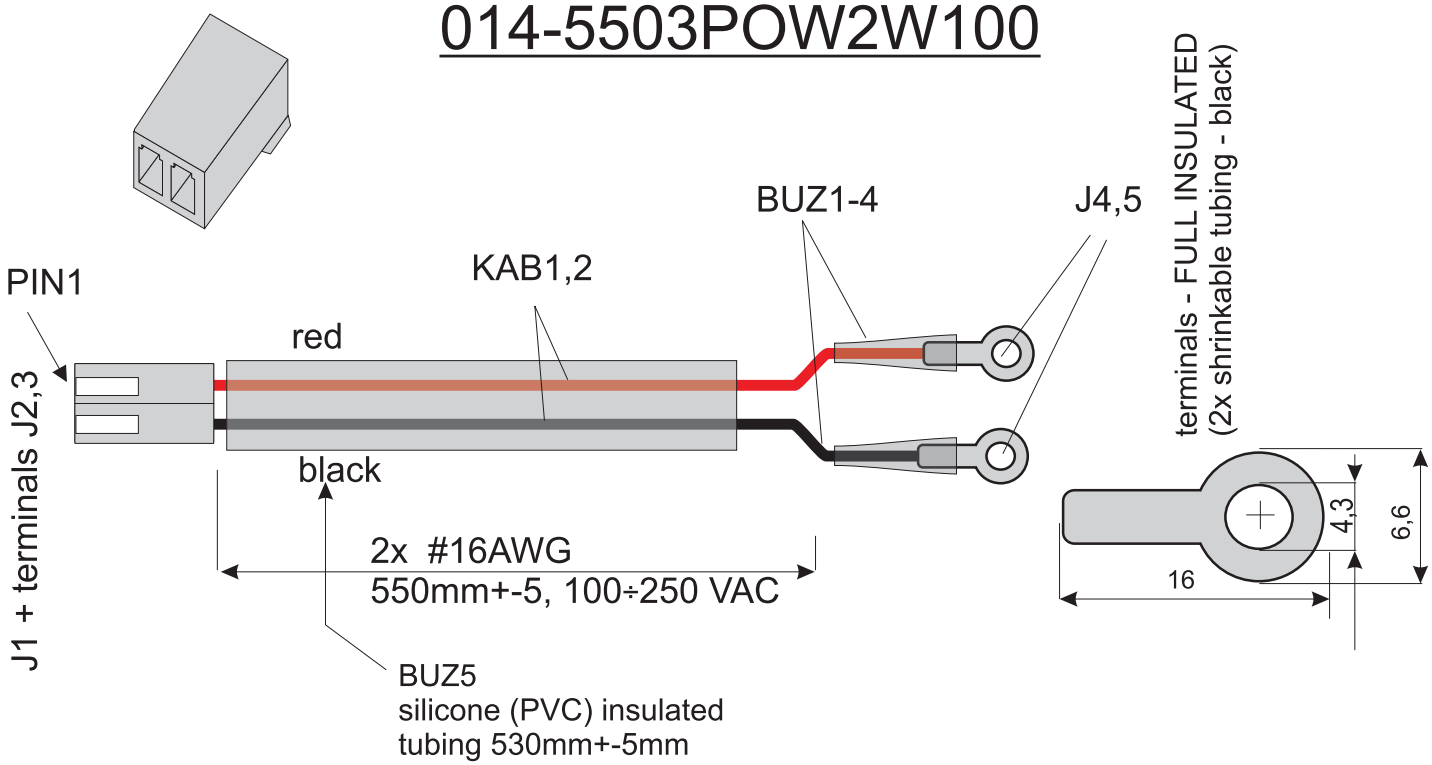


Connectors:

Description	Reference	Molex	JST	AVA
Housing - 3.96mm pitch female terminals	J1 J2-3	35977-0200 35922-9002	VHR-2N SVH-41T-P1,1	4200-2P 4200-T
Mating products			B 2P-VH	4100-2PST

Název výrobku: Product name:	**Speaker cable**			
BTL Medical Technologies	Kreslil: Drown by: **PL30/10/2007**	Materiál: Material:		
	Konstr.: Designed by: **PL30/10/2007**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN30/10/2007**	List: Sheet: **1** z of **1**	Číslo výkresu: Sheet number:	**014-5502speak2w100**

014-5503POW2W100



PIN	WIRE COLOR	MOTOR LINK
2	black	U1
1	red	W1

Connectors:

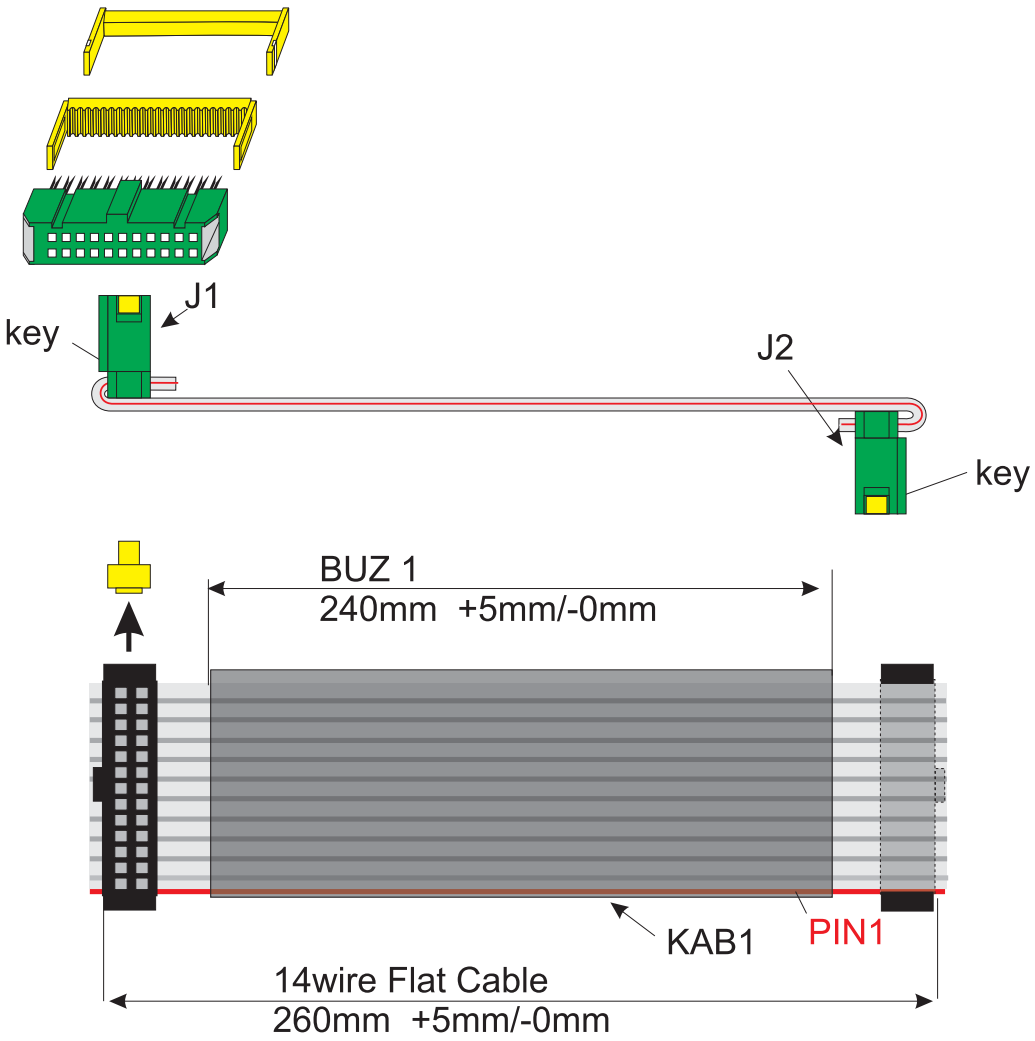
Description	Reference	Molex	JST	AVA
Housing - 5,08 Pitch terminals	J1 J2,3	5058-N (o.n. 10-01-5042) 5168 (5167)	VBR-2 SVH-21T-P1.1	4300-2P-Y 8400-T (TA)
Mating products		5281-NA	B2P-VB-4	4400-2P

Quick connect Female Receptable	J4,5			
Mating products				

Změna: Change No.:	Popis změny: Change description:	Kreslil: Drawn by:	Konstruoval: Designed by:	Schválil: Approved by:	Pův. verze: Previous ver.:
z4	**correction of PIN1**	**PL17/04/2008**	**PL17/04/2008**	**TN17/04/2008**	**100z3**
z3	**correction of color wire**	**PL27/02/2008**	**PL27/02/2008**	**TN27/02/2008**	**100z2**
z2	**length change**	**PL26/11/2007**	**PL26/11/2007**	**TN26/11/2007**	**100z1**
z1	**change of cable AWG**	**PL12/11/2007**	**PL12/11/2007**	**TN12/11/2007**	**100**

Název výrobku: Product name:	**supply cable POWER**			
BTL Medical Technologies	Kreslil: Drown by: **PL30/10/2007**	Materiál: Material:		
	Konstr.: Designed by: **PL30/10/2007**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN30/10/2007**	List: Sheet: **1** z of **1**	Číslo výkresu: Sheet number:	**014-5503pow2w100z4**

014-5504COM14W102



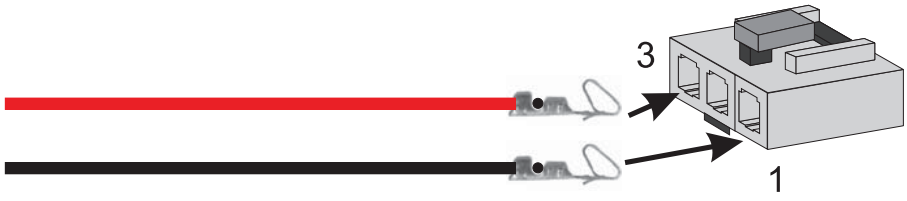
Connectors:

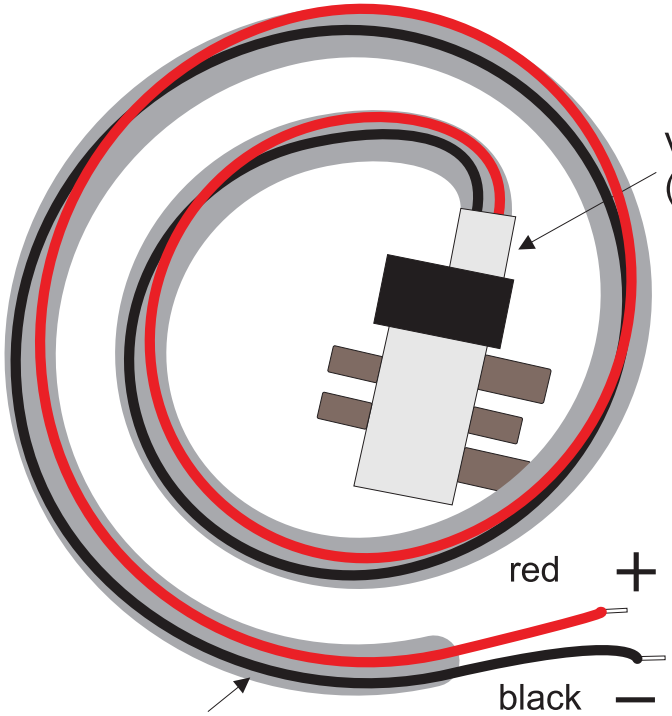
Description	Reference	Molex	JST	AVA
Ribon cable Connectors Pitch	J1,J2	39-51-2263	RA-S261T-(1290)	6700-A-26P-Y-A-B-S1
Mating products		39-26-7265	RK-4261TD	6900-A-10-S-B-T

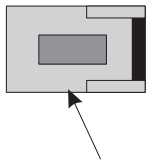
Změna: Change No.:	Popis změny: Change description:	Kreslil: Drawn by:	Konstruoval: Designed by:	Schválil: Approved by:	Pův. verze: Previous ver.:
z1	**change of key at J2**	**PL01/10/2008**	**PL01/10/2008**	**TN01/10/2008**	**102**

Název výrobku: Product name:	**communication cable**			
BTL Medical Technologies	Kreslil: Drown by: **PL30/10/2007**	Materiál: Material:		
	Konstr.: Designed by: **PL30/10/2007**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN30/10/2007**	List: Sheet: **1** z of **1**	Číslo výkresu: Sheet number: **014-5504com14w102z1**	

014-5505CONTROL2W100







J1+terminals J2-J3

PIN CONNECTION:

PIN	WIRE COLOR	VALVE
1	black	-
2	NC	
3	red	+

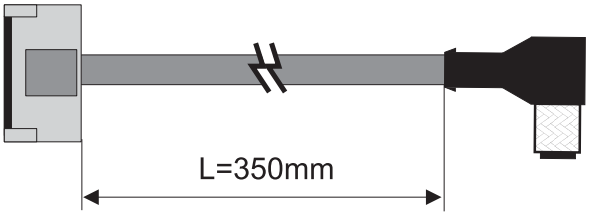
Connectors:

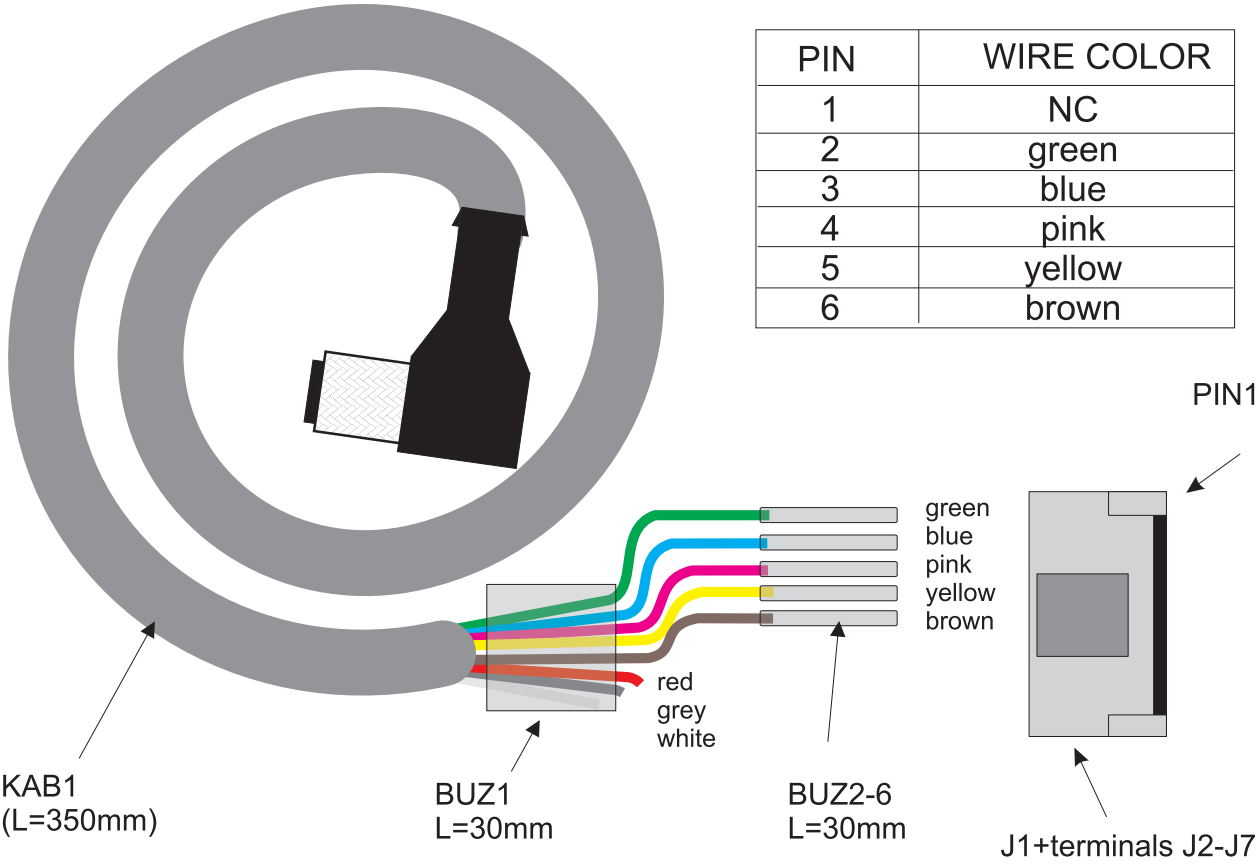
Description	**Reference**	**Molex**	**JST**	**AVA**
Housing - 3.96mm pitch female terminals	J1 J2-3	35977-0300 35922-9002	VHR-3N SVH-41T-P1,1	4200-3P 4200-T
Mating products			B 2P-VH	4100-2PST

Změna: Change No.:	Popis změny: Change description:	Kreslil: Drawn by:	Konstruoval: Designed by:	Schválil: Approved by:	Pův. verze: Previous ver.:
z3	**change of connector PIN at J1**	**PL10/08/2008**	**PL10/08/2008**	**TN10/08/2008**	**100z2**
z2	**length change**	**PL26/11/2007**	**PL26/11/2007**	**TN26/11/2007**	**100z1**
z1	**change of connector PIN at J1**	**PL12/11/2007**	**PL12/11/2007**	**TN12/11/2007**	**100**

Název výrobku: Product name:	**Operating cable**			
BTL Medical Technologies	Kreslil: Drown by: **PL30/10/2007**	Materiál: Material:		
	Konstr.: Designed by: **PL30/10/2007**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN30/10/2007**	List: Sheet: **1** z of **1**	Číslo výkresu: Sheet number:	**014-5505control2w100z3**

014-5506LINK8W100





PIN	WIRE COLOR
1	NC
2	green
3	blue
4	pink
5	yellow
6	brown

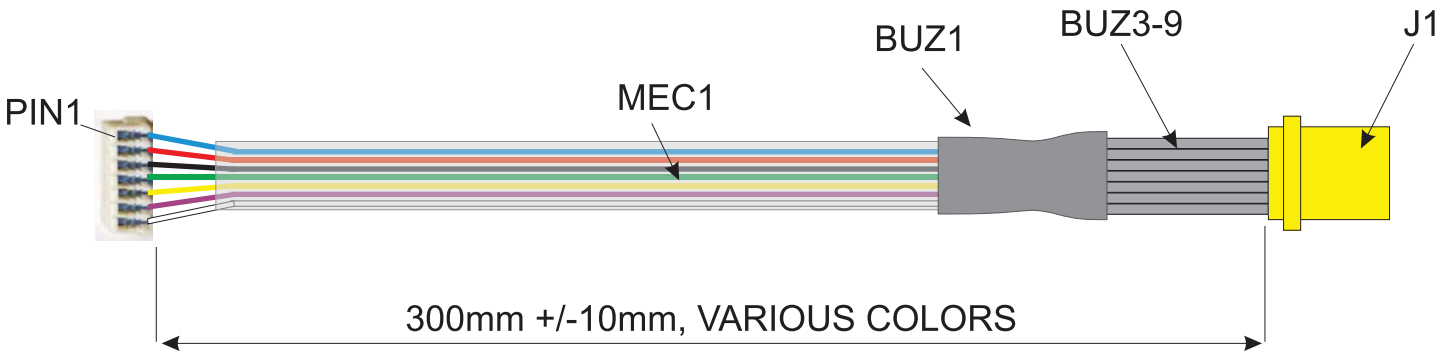
Connectors:

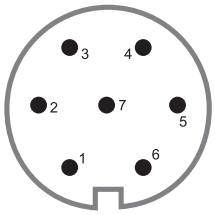
Description	Reference	Molex	JST	AVA
Housing - 3.96mm pitch female terminals	J1 J2-7		VHR-6N	4200-6P 4200-T
Mating products			B 6P-VH	4100-6PST

Změna: Change No.:	Popis změny: Change description:	Kreslil: Drawn by:	Konstruoval: Designed by:	Schválil: Approved by:	Pův. verze: Previous ver.:
z2	**BUZ2-6 added**	**PL18/07/2008**	**PL18/07/2008**	**TN18/07/2008**	**100z1**
z1	**length specification**	**PL26/11/2007**	**PL26/11/2007**	**TN26/11/2007**	**100**

Název výrobku: Product name:	**Connection cable**			
BTL Medical Technologies	Kreslil: Drown by: **PL30/10/2007**	Materiál: Material:		
	Konstr.: Designed by: **PL30/10/2007**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN30/10/2007**	List: Sheet: **1** z of **1**	Číslo výkresu: Sheet number:	**014-5506link8w100z2**

014-5508PAC7W100



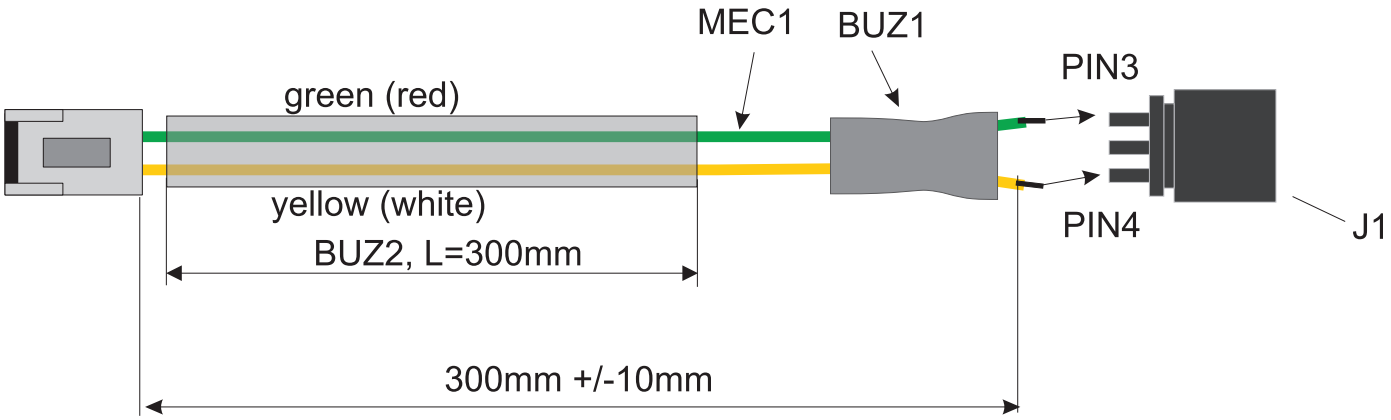


1 -	blue / modrá	**1**
2 -	red / červená	**2**
3 -	black / černá	**3**
4 -	green / zelená	**4**
5 -	yellow / žlužá	**5**
6 -	violet / fialová	**6**
7 -	white / bílá	**7**

Změna: Change No.:	Popis změny: Change description:	Kreslil: Drawn by:	Konstruoval: Designed by:	Schválil: Approved by:	Pův. verze: Previous ver.:
z1	**change of length cable**	**PL21/04/2008**	**PL21/04/2008**	**TN21/04/2008**	**100**

Název výrobku: Product name:	**patient cable GENER**			
BTL Medical Technologies	Kreslil: Drown by: **PL18/12/2007**	Materiál: Material:		
	Konstr.: Designed by: **PL18/12/2007**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN18/12/2007**	List: Sheet: **1** z of **1**	Číslo výkresu: Sheet number:	**014-5508pac7w100z1**

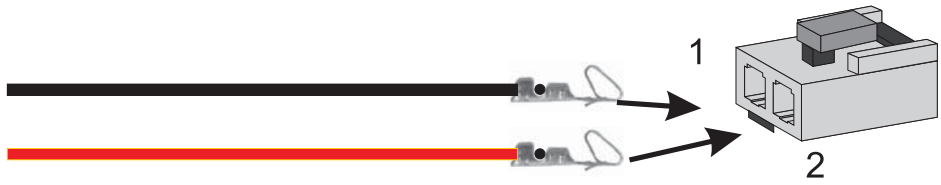
014-5509PAC2W100

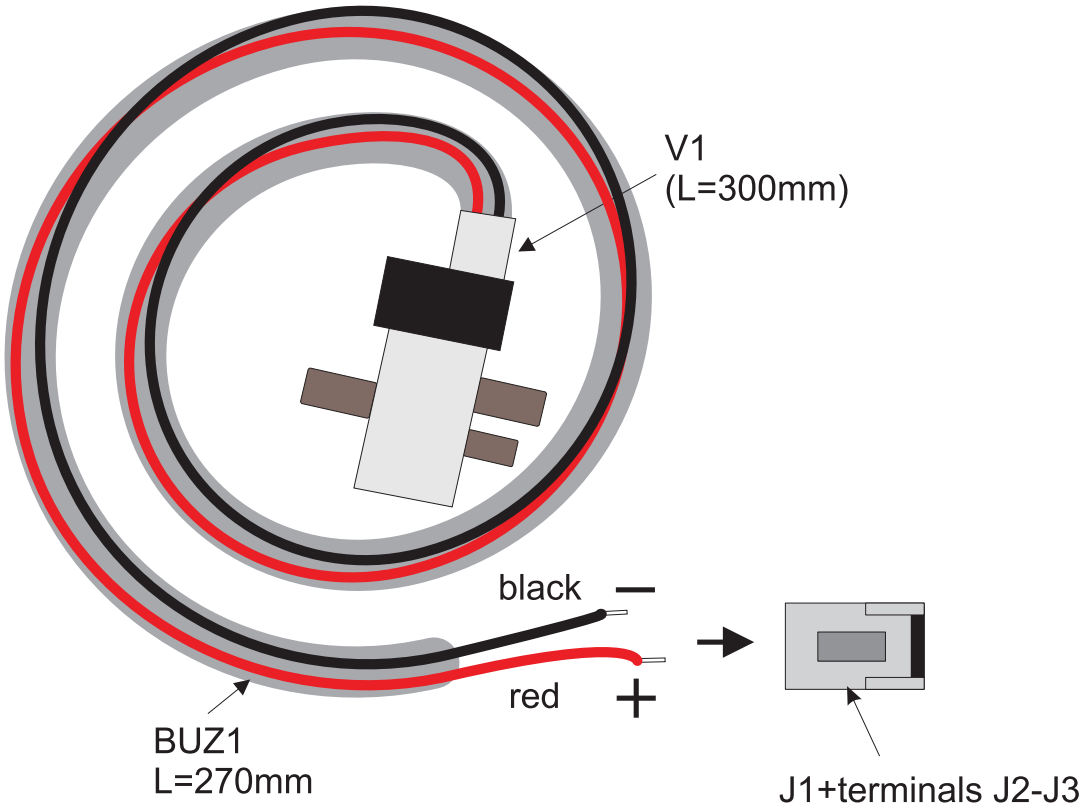


Změna: Change No.:	Popis změny: Change description:	Kreslil: Drawn by:	Konstruoval: Designed by:	Schválil: Approved by:	Pův. verze: Previous ver.:
z2	**length changed**	**PL23/04/2008**	**PL23/04/2008**	**TN23/04/2008**	**100z1**
z1	**BUZ2 added**	**PL20/12/2007**	**PL20/12/2007**	**TN20/12/2007**	**100**

Název výrobku: Product name:	**PACIENT CABLE - GENER**			
BTL Medical Technologies	Kreslil: Drown by: **PL18/12/2007**	Materiál: Material:		
	Konstr.: Designed by: **PL18/12/2007**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN18/12/2007**	List: Sheet: **1** z of **1**	Číslo výkresu: Sheet number:	**014-5509pac2w100z2**

014-5510CONTROL2W100





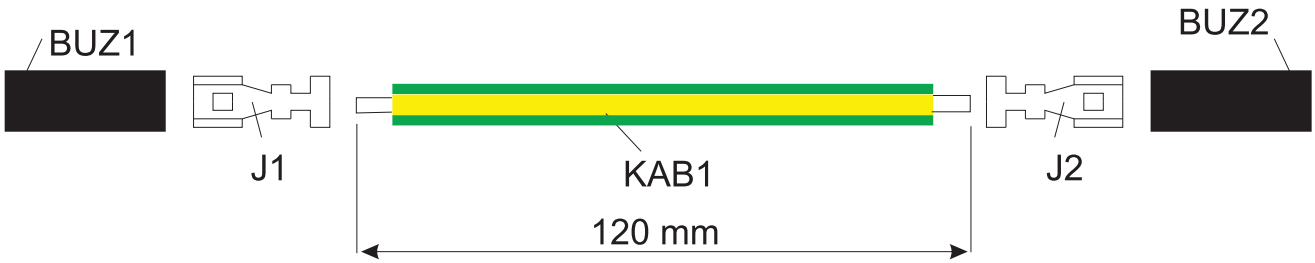
Connectors:

Description	Reference	Molex	JST	AVA
Housing - 3.96mm pitch female terminals	J1 J2-3	35977-0200 35922-9002	VHR-2N SVH-41T-P1,1	4200-2P 4200-T
Mating products			B 2P-VH	4100-2PST

Změna: Change No.:	Popis změny: Change description:	Kreslil: Drawn by:	Konstruoval: Designed by:	Schválil: Approved by:	Pův. verze: Previous ver.:

Název výrobku: Product name:	**Operating cable**			
Medical Technologies	Kreslil: Drown by: **PL21/12/2007**	Materiál: Material:		
	Konstr.: Designed by: **PL21/12/2007**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN21/12/2007**	List: Sheet: **1** z of **1**	Číslo výkresu: Sheet number:	**014-5510control2w100**

014-5511EARTH1W100



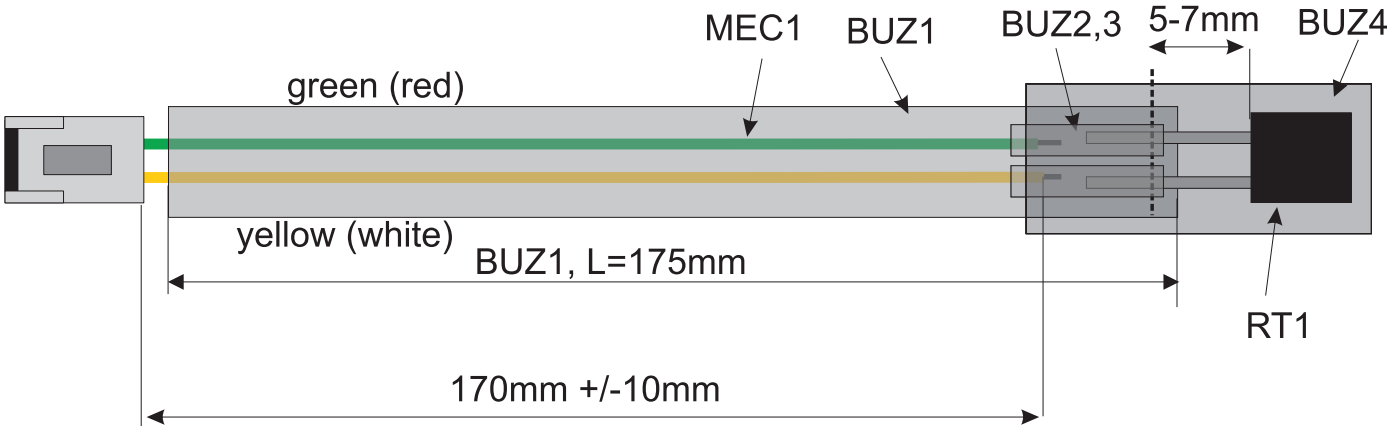
BUZ1+BUZ2-2x Shrinkable tubing - black
KAB1- green-yellow earthing cable 1mm
Cable length 100mm

Description	Reference	MOLEX	JST	AVA
Quick Connect Female Receptacle for 6.3x0.8mm Tabs	**J1, J2**	**94512-0201**		

Změna: Change No.:	Popis změny: Change description:	Kreslil: Drawn by:	Konstruoval: Designed by:	Schválil: Approved by:	Pův. verze: Previous ver.:
z1	**cable length changed**	**PL29/02/2008**	**PL29/02/2008**	**TN29/02/2008**	**100**

Název výrobku: Product name:	**Earthing cable**			
Medical Technologies	Kreslil: Drown by: **PL10/01/2008**	Materiál: Material:		
	Konstr.: Designed by: **PL10/01/2008**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN10/01/2008**	List: Sheet: **1** z of **1**	Číslo výkresu: Sheet number:	**014-5511earth1w100**

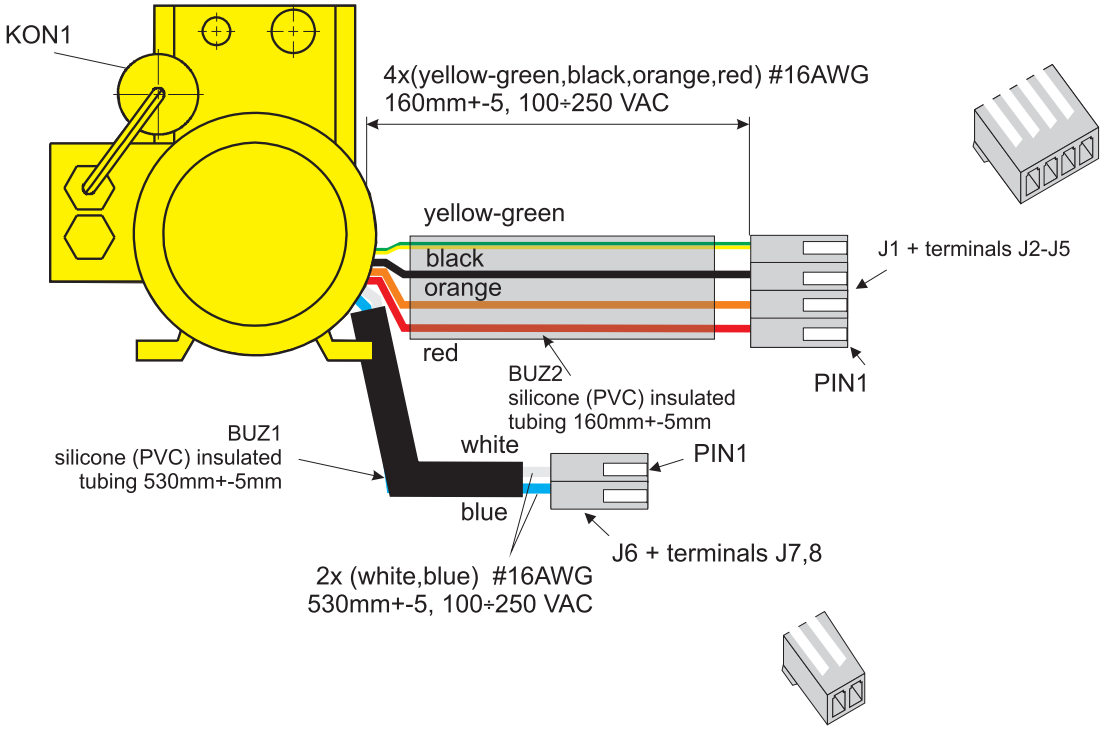
014-5512DETECT2W100



Změna: Change No.:	Popis změny: Change description:	Kreslil: Drawn by:	Konstruoval: Designed by:	Schválil: Approved by:	Pův. verze: Previous ver.:

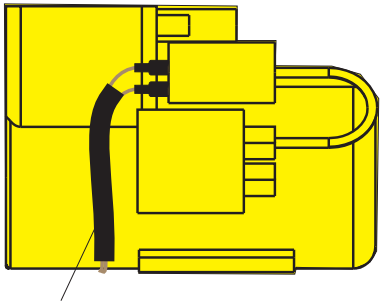
Název výrobku: Product name:	**DETECTOR CABLE**			
Medical Technologies	Kreslil: Drown by: **PL18/12/2007**	Materiál: Material:		
	Konstr.: Designed by: **PL18/12/2007**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN18/12/2007**	List: Sheet: **1** z of **1**	Číslo výkresu: Sheet number:	**014-5512detect2w100**

014-5513POW6W100



Connectors:

PIN	WIRE COLOR
1	red
2	orange
3	black
4	yellow-green



PIN	WIRE COLOR
1	white
2	blue

Connectors:

Description	Reference	Molex	JST	AVA
Housing - 5,08 Pitch terminals	J6 J7,8	5058-N (o.n. 10-01-5042) 5168 (5167)	VBR-2 SVH-21T-P1.1	4300-2P-Y 8400-T (TA)
Mating products		5281-NA	B2P-VB-4	4400-2P

Description	Reference	Molex	JST	AVA
Housing - 5,08 Pitch terminals	J1 J2-5	5058-N (o.n. 10-01-5042) 5168 (5167)	VBR-4 SVH-21T-P1.1	4300-4P-V 8400-T (TA)
Mating products		5281-NA	B2P-VB-4	4400-4P

Změna: Change No.:	Popis změny: Change description:	Kreslil: Drown by:	Konstruoval: Designed by:	Schválil: Approved by:	Pův. verze: Previous ver.:

Název výrobku: Product name: **supply cable POWER with pump GD**

MEDICAL TECHNOLOGIES

Kreslil: Drown by: **PL01/12/2008**	Materiál: Material:			
Konstr.: Designed by: **PL01/12/2008**	Povrch. úprava: Surface finish:		Měřítko: Scale:	
Schválil: Approved by: **TN01/12/2008**	List: Sheet: **1** z of **1**	Číslo výkresu: Sheet number: **014-5513pow6w100**		

BTL-5000 SWT
List of Components

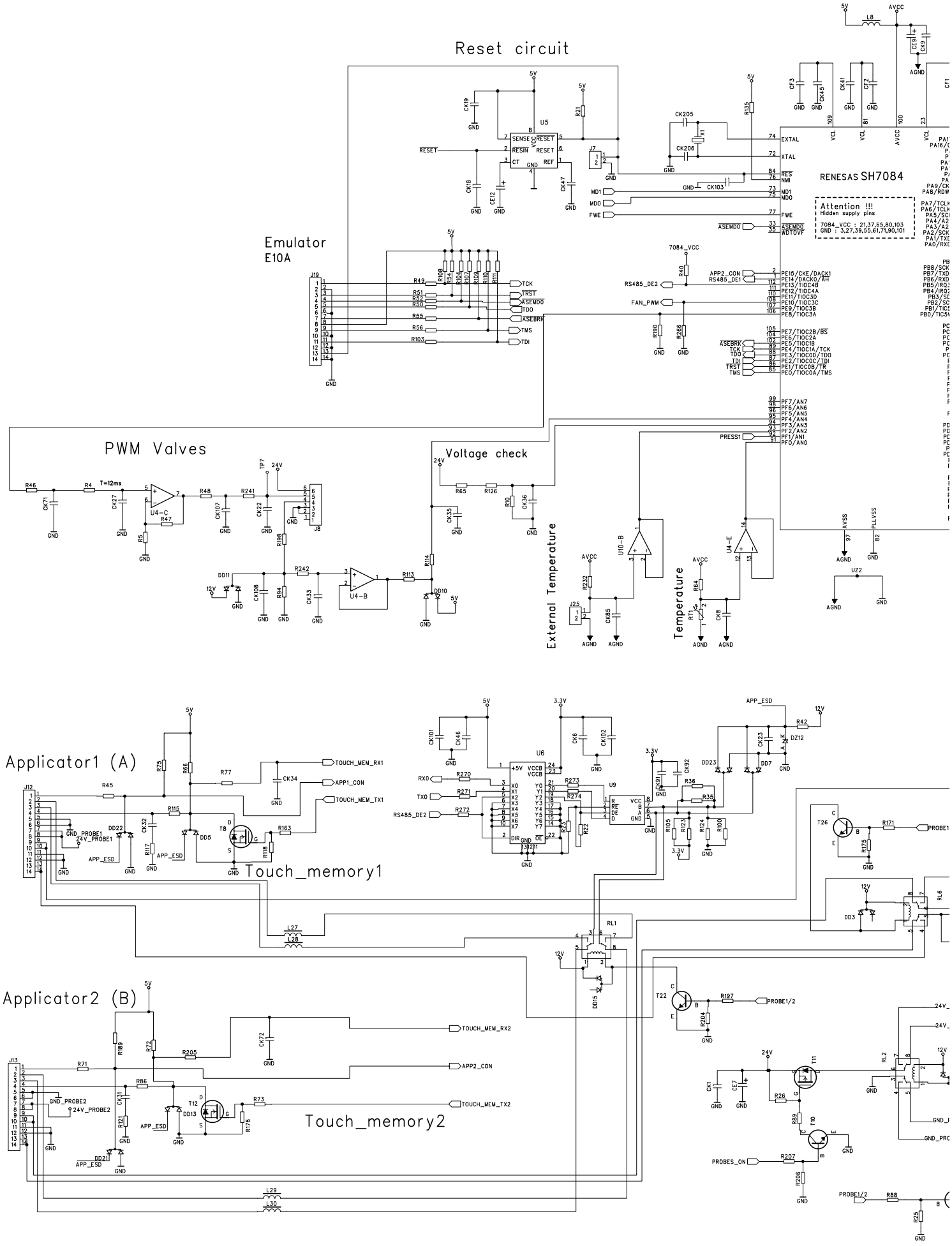
101PL28/11/2008EN

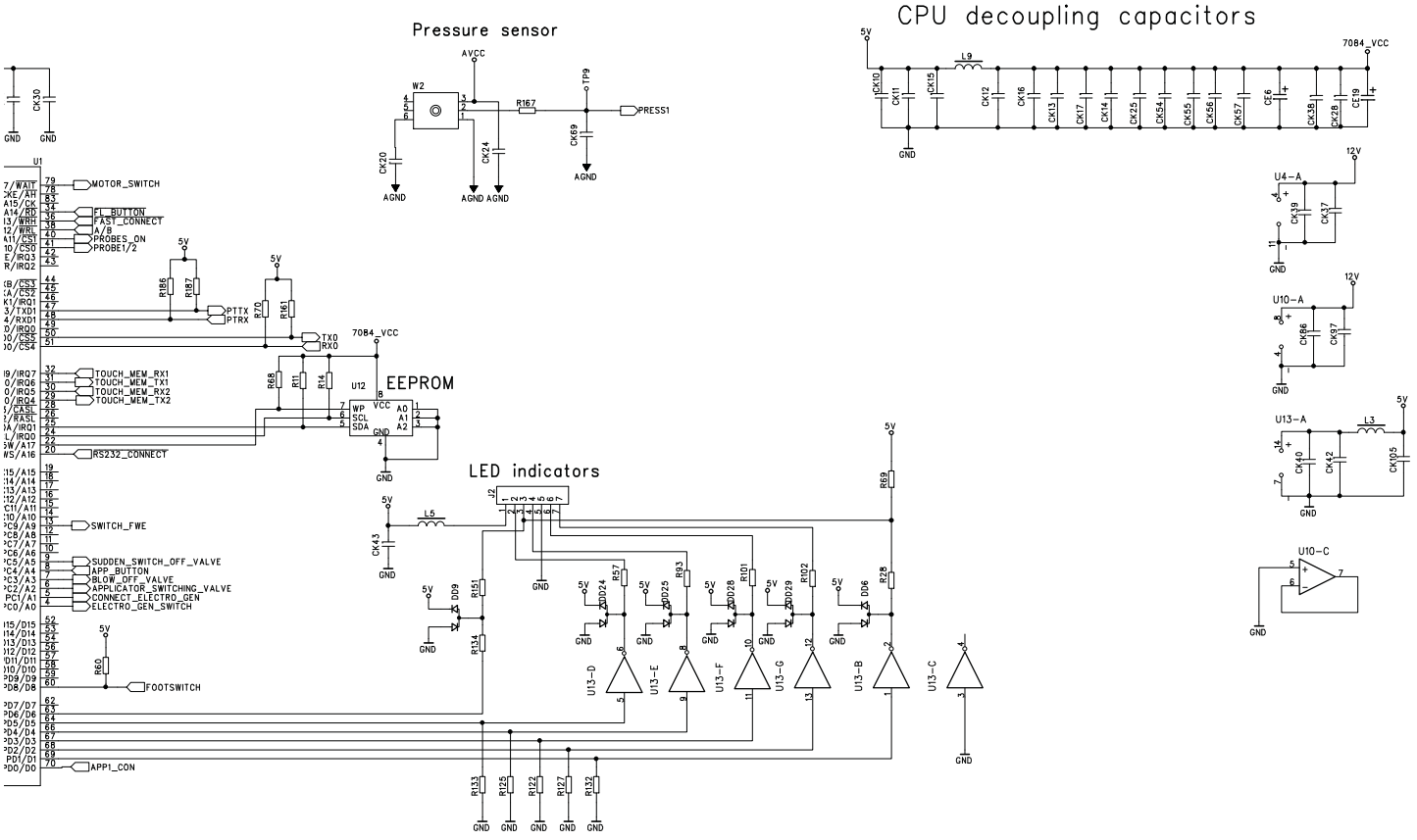
REFERENCE	COMPONENT
MEC1	014-1100COVER101
MEC15	014-1201COVERAS102
MEC160	014-1304COVER101
MEC180	014-1401COVER103
MEC143	014-2101HOLDFEED100
MEC140	014-2102HOLDFILT101
MEC102,103	014-2103PROFILE102
MEC120,121	014-2104PUMPMAT101
MEC13,14	014-2105HOLDBOTTL102
MEC105	014-2106HOLDVALVE101
MEC150	014-2107HOLDPCB101
MEC117	014-2108MOTORMAT100
MEC141	014-2109HOLDTRAFO101
MEC112	014-2110VALVEMAT102
MEC10	014-2111HOLDL100
MEC11	014-2112HOLDR100
MEC2	014-2113DISTPLATE100
MEC250	014-2120HOLDFAN100
MEC151	014-52GENPNEU105
MEC3	014-52LEDS101
MEC12	014-52MAINS102
MEC450	014-52REDUCT100
MEC325,330	014-5504COM14W102
MEC110	014-5505CONTROL2W100
MEC360	014-5506LINK8W100
MEC335,340	014-5508PAC7W100
MEC350	014-5509PAC2W100
MEC111	014-5510CONTROL2W100
MEC370,375	014-5511EARTH1W100
MEC380	014-5512DETECT2W100
MEC200	014-9015EN100
MEC142	014-ADAPTOR100
MEC100	014-BASEFRAME1101
MEC101	014-BASEFRAME2102
MEC400	014-PUMPSETG100
MEC300	028-5501100
MEC315	038-5501100
MEC345	073-5509101
MEC190	233-4127101
MEC4-7	300-2014100
MEC355	300-5511100
MEC320	300-5521100
MEC205	300-9030EN101
BUZ1-4	EBUZ-MD4.8XX0
BUZ110,111,250	EBUZ-SD4T0.5XX0
BUZ355	EBUZ-SD4T0.5XX0
HAD155,160,165	EHAD-PFAND6T1XX0
HAD135,115,116	EHAD-PLND4T0.75XX0
HAD100, 105,110,120,125,140,	EHAD-PLND6T1XX0
IPA120,121	EIPA-DM918XX0
J110,250	EJ-4200-2PXX0
J112-113,251-252	EJ-4200-TXX0

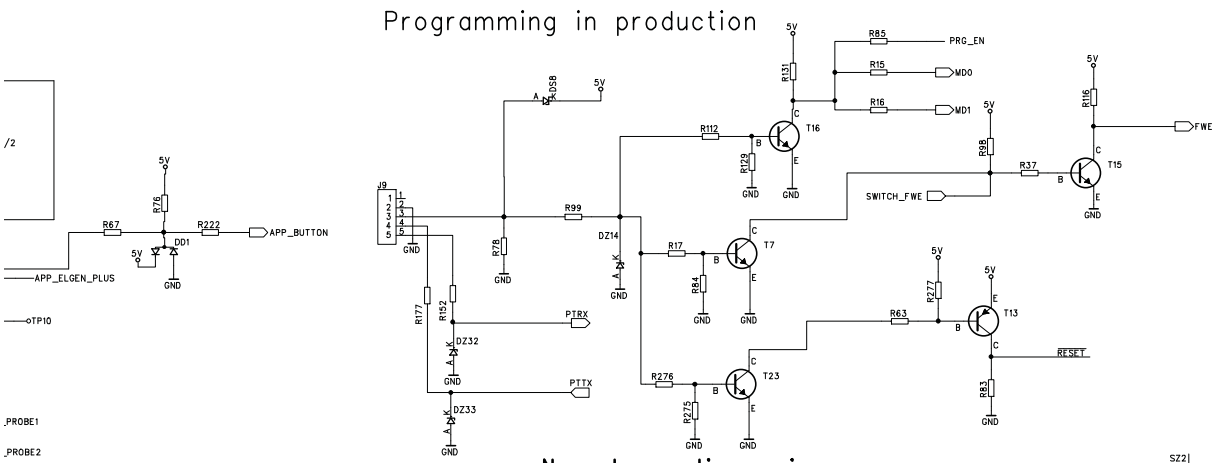
REFERENCE	COMPONENT
J451,452	EJ-GX3LOCXX1
KAB145	EKAB-PU4x2.5XX0
KON190	EKON-CAP2518XX0
KON200,201,202,203	EKON-F0301CVXX1
KON205,206,207	EKON-F0301CVXX4
KON140	EKON-FILTERG2x1/4XX1
KON116,117	EKON-HD4M5XX1
KON147	EKON-HD6G1/4XX1
KON118-119	EKON-HD6M5XX1
KON149	EKON-KD4M5XX0
KON110,111,250	EKON-KDE1208XX0
KON121,122	EKON-LD6G1/4XX1
KON131	EKON-LD6G1/8XX1
KON135,136	EKON-LD6G1/8XX1
KON115	EKON-LD6M5XX0
KON120	EKON-PUMP0.9LXX0
KON100-109,141-147	EKON-RIVET4x8XX0
KON137	EKON-SILENTG1/8XX1
KON130	EKON-SILENTG1/8XX2
KON112-114	EKON-SILENTM5XX1
KON180-181	EKON-SWTHAND100
KON123	EKON-TD2X6D4XX1
KON148	EKON-TD6G2x1/4XX1
MAT170-175, 10-13,14-21,250-253	EMAT-M3STXX0
MAT150-153	EMAT-M3ZnXX0
MAT110-117,254-257	EMAT-M4STXX0
MAT104,105	EMAT-M4ZnXX0
MTR1,180,181	EMTR-INSULANT10XX0
MTR170,175	EMTR-PEFOIL3XX0
POD1-2,100-103,150-153,144-145	EPOD-3VEJIRXX0
POD 140-143,104,105,	EPOD-4VEJIRXX0
SLO1-2	ESLO-6M3x15XX0
SLO150-153	ESLO-6M3x30XX0
SRO22,23	ESRO-3.5x9.5XX1
SRO122,123,133-134,127-130	ESRO-40x10XX0
SROSRO118-121,131,132,160-167	ESRO-M3x10XX1
SRO14-17, 18-21, 150-153, 168	ESRO-M3x10XX5
SRO1-2,100-103,144-145	ESRO-M3x6XX1
SRO10-13,154-155,180-183	ESRO-M3x8XX2
SRO140-143	ESRO-M4x25XX4
SRO110-117,	ESRO-M4x35XX0
SRO104-105	ESRO-M4x80XX0
SRO174 - 177	ESRO-M6x8XX1
SW10	ESW-H8550VBXX0
V132	EV-D6G1/8XX0
V131	EV-E22-024VXX0
V140	EV-G1/4BAR7.5XX0
V130	EV-G1/8BAR10XX0
V100	EV-G2X1/8BAR6XX0

BTL-5000 SWT Series

ELECTRICAL DRAWINGS


Reset circuit
Emulator
E10A
RENESAS SH7084
Attention !!!
Hidden supply pins
7084_VCC : 21,37,65,80,103
GND : 3,27,39,55,61,71,90,101
PWM Valves
Voltage check
External Temperature
Temperature
Applicator1 (A)
Touch_memory1
Applicator2 (B)
Touch_memory2

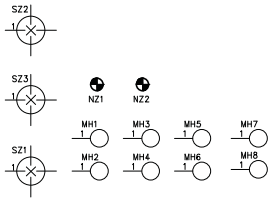




Normal operation regime:
FWE= 0, MD0= 1, MD1= 1 (Single Chip Mode)

Programming in production:
FWE= 1, MD0= 0, MD1= 0 (Booting mode)

In application programming
FWE= 1, MD0= 1, MD1= 1 (User prog. mode)



Zmena: Change No.:	Popis zmeny: Change description:	Navrhoval: Designed by:	Schvalil: Approved by:	Predosla verze: Previous version:
105	See file: 'Pozadavky_upravy_verze_105.xls'	AG25.03.2008	VS25.03.2008	104z1

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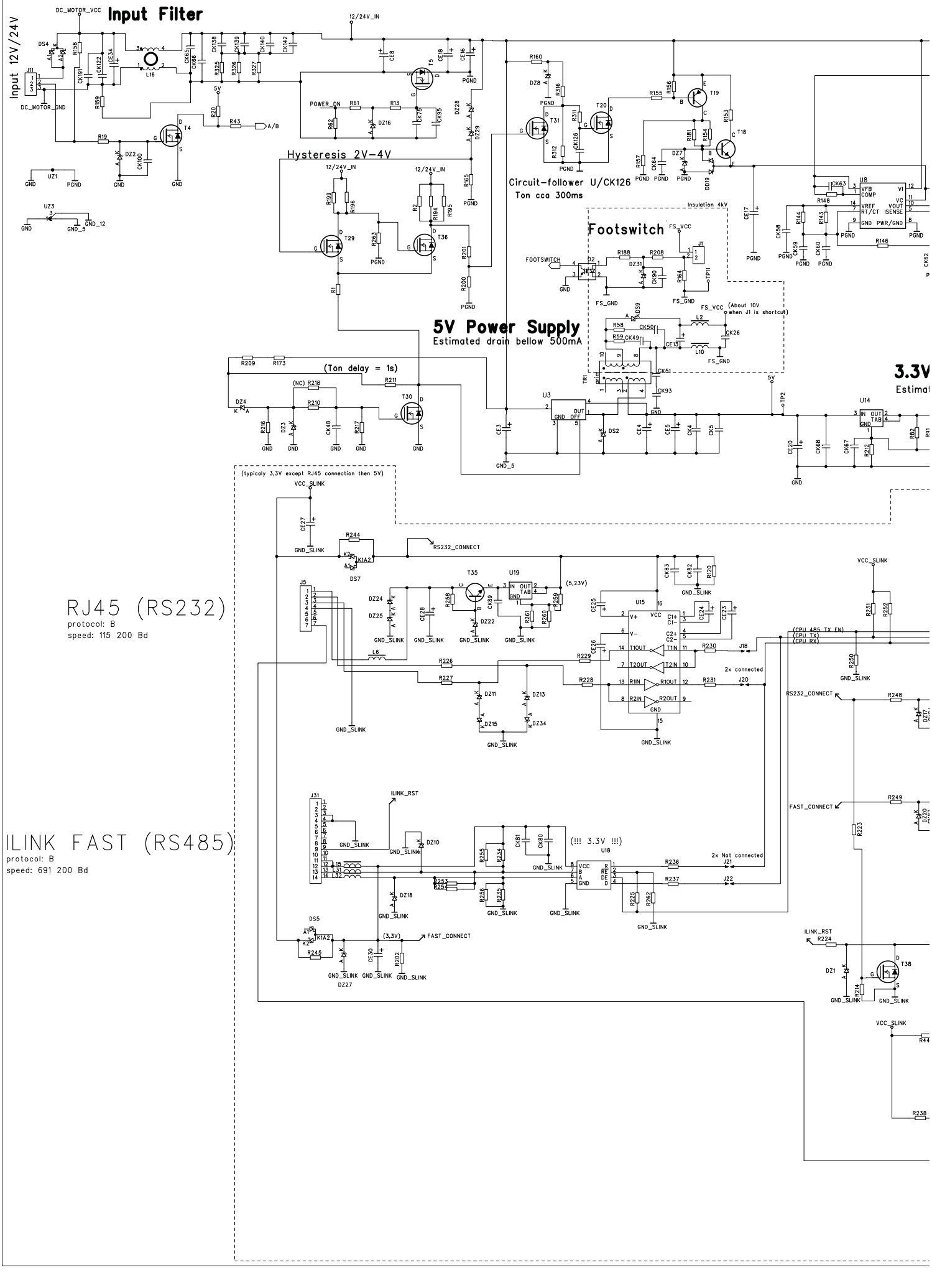
Navrhoval: Designed by:	AG 28.02.2008
Schválil: Approved by:	VS 28.02.2008
Nazev vyrobku: Product name:	SHOCK WAVE

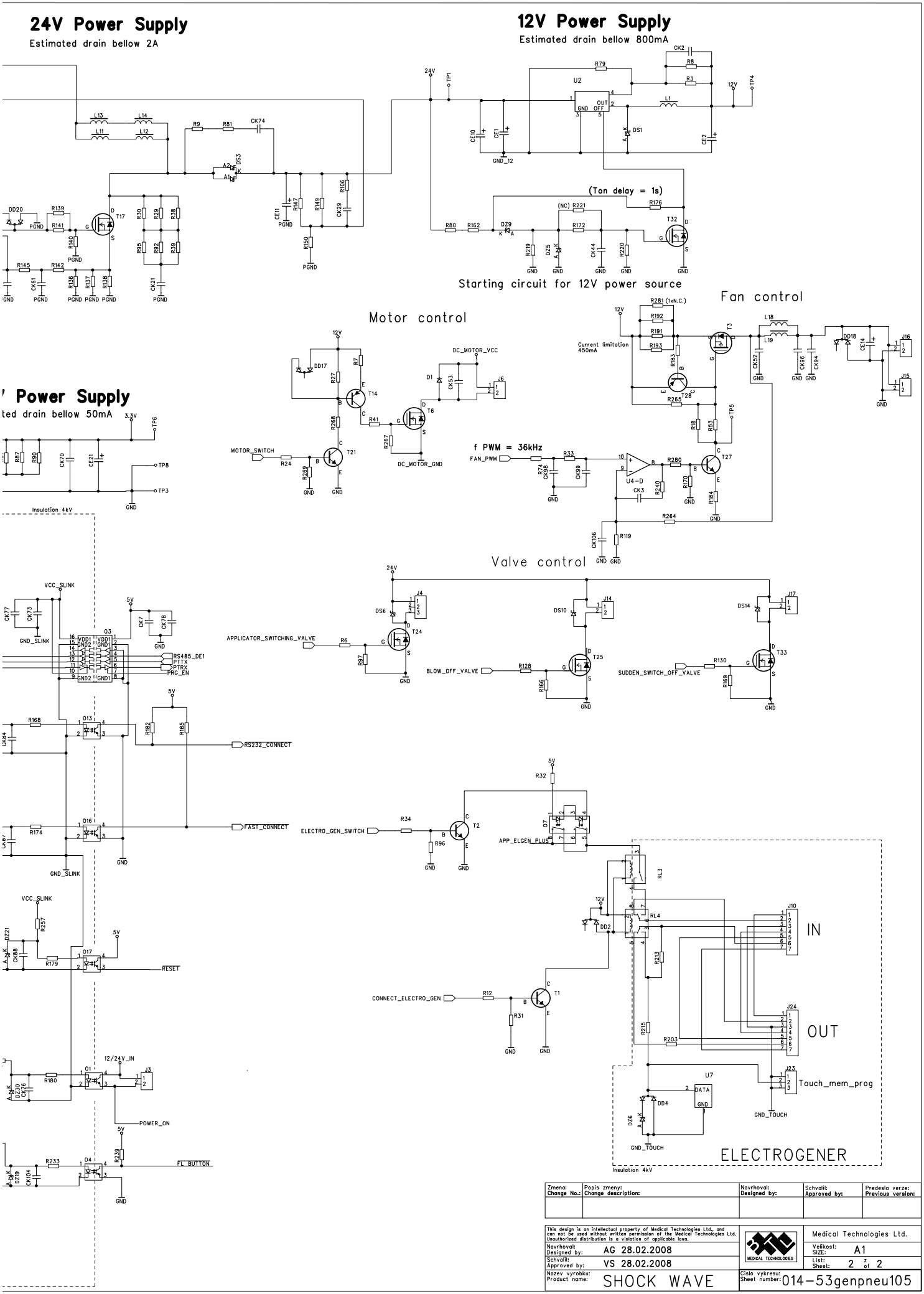
Medical Technologies Ltd.

Velikost: SIZE: A1

List: Sheet: 1 z of 2

Cislo vykresu: Sheet number: 014-53genpneu105


Input 12V/24V
Input Filter
DC_MOTOR_VCC
DC_MOTOR_GND
12/24V_IN
Hysteresis 2V-4V
Circuit-follower U/CK126
Ton cca 300ms
Footswitch
FS_VCC
FS_GND
Insulation 4kV
5V Power Supply
Estimated drain bellow 500mA
(Ton delay = 1s)
3.3V
(typicaly 3,3V except RJ45 connection then 5V)
VCC_SLINK
GND_SLINK
RS232_CONNECT
FAST_CONNECT
ILINK_RST
(5,23V)
(3,3V)
(!!! 3.3V !!!)
2x connected
2x Not connected
(CPU 485 TX EN)
(CPU TX)
(CPU RX)
RJ45 (RS232)
protocol: B
speed: 115 200 Bd
ILINK FAST (RS485)
protocol: B
speed: 691 200 Bd



Zmena: Change No.:	Popis zmeny: Change description:	Navrhoval: Designed by:	Schvalil: Approved by:	Predesla verze: Previous version:

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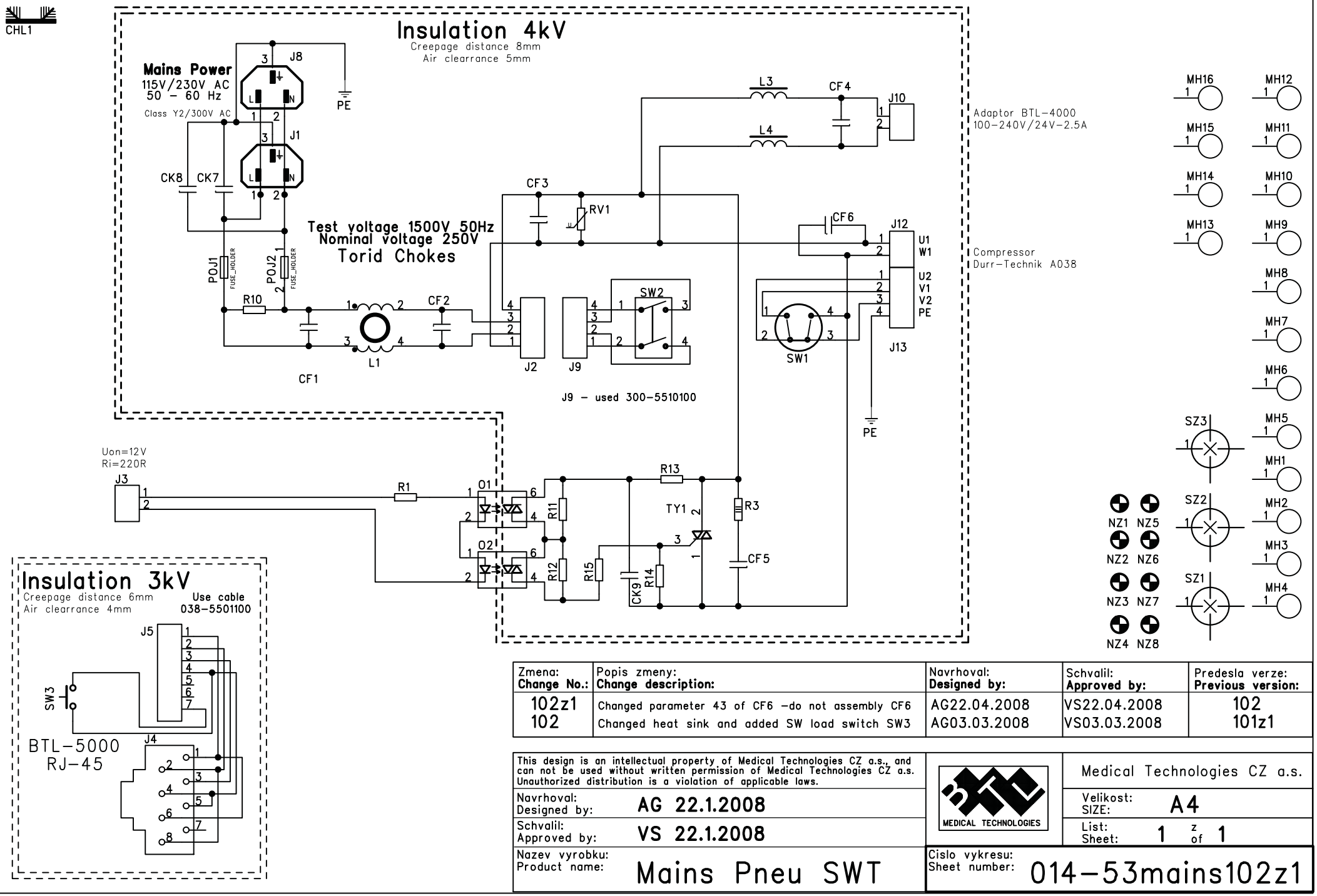
Navrhoval: Designed by:	AG 28.02.2008	Medical Technologies Ltd.	
Schvalil: Approved by:	VS 28.02.2008	Velikost: SIZE:	A1
Nazev vyrobku: Product name:	SHOCK WAVE	List: Sheet:	2 z 2 of 2
		Cislo vykresu: Sheet number:	014-53genpneu105



Zmena: **Change No.:**	Popis zmeny: **Change description:**	Navrhoval: **Designed by:**	Schvalil: **Approved by:**	Predesla verze: **Previous version:**
102z1	Changed parameter 43 of CF6 –do not assembly CF6	AG22.04.2008	VS22.04.2008	102
102	Changed heat sink and added SW load switch SW3	AG03.03.2008	VS03.03.2008	101z1

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Navrhoval: Designed by:	AG 22.1.2008
Schvalil: Approved by:	VS 22.1.2008
Nazev vyrobku: Product name:	Mains Pneu SWT

MEDICAL TECHNOLOGIES

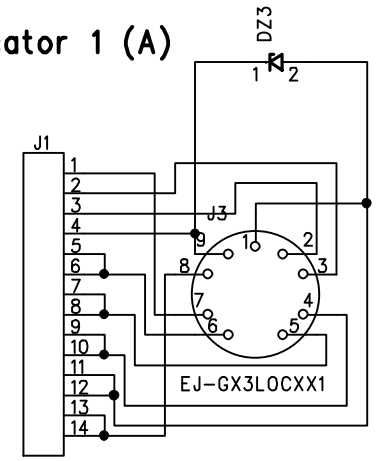
Medical Technologies CZ a.s.

Velikost: SIZE: A4

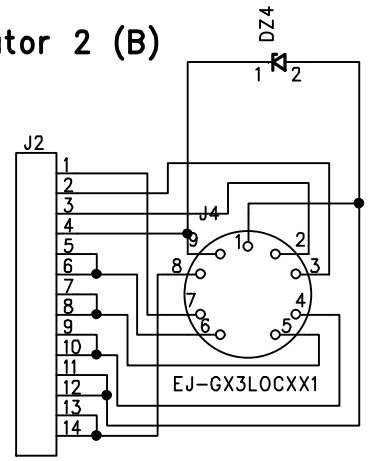
List: Sheet: 1 z of 1

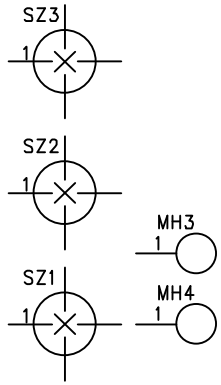
Cislo vykresu: Sheet number: 014–53mains102z1

Applicator 1 (A)



Applicator 2 (B)





Zmena: **Change No.:**	Popis zmeny: **Change description:**	Navrhoval: **Designed by:**	Schvalil: **Approved by:**	Predesla verze: **Previous version:**

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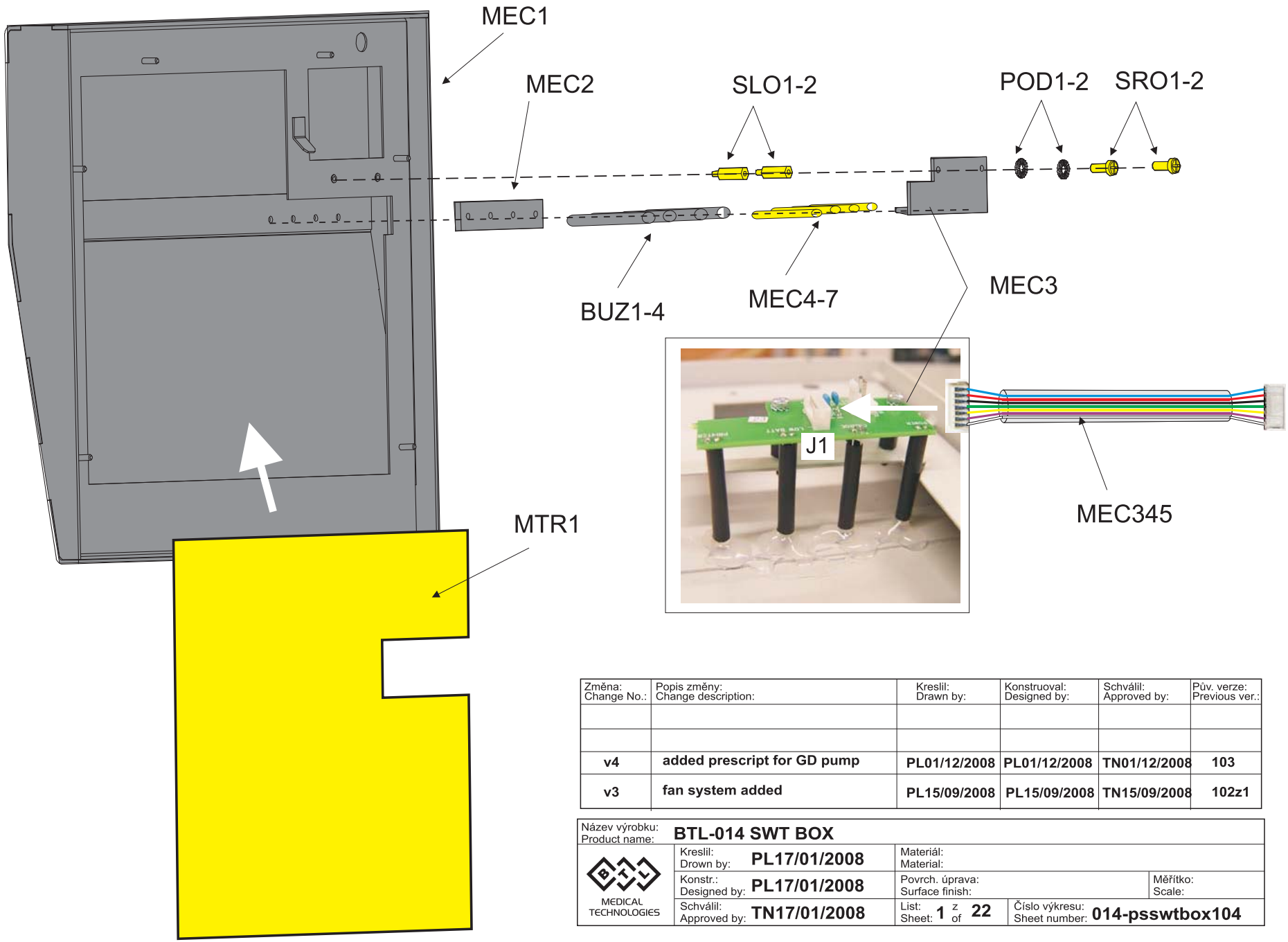
Navrhoval: Designed by:	AG 10.6.2008
Schvalil: Approved by:	VS 12.6.2008
Nazev vyrobku: Product name:	Redukce Pneu SWT

MEDICAL TECHNOLOGIES

Medical Technologies CZ a.s.

Velikost: SIZE:	A4
List: Sheet:	1 z of 1
Cislo vykresu: Sheet number:	014-53reduct100

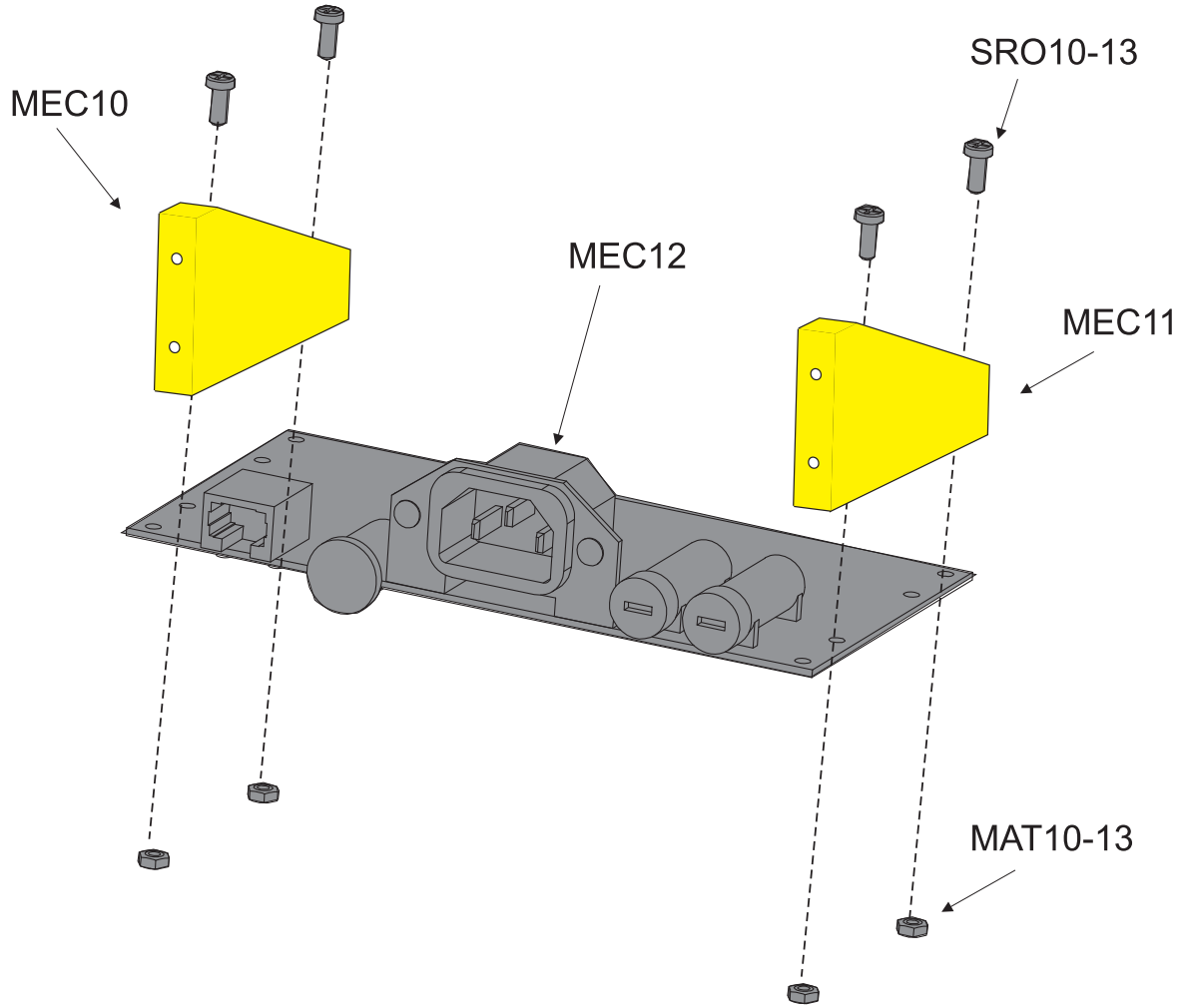
FRONT PANEL:



Změna: Change No.:	Popis změny: Change description:	Kreslil: Drawn by:	Konstruoval: Designed by:	Schválil: Approved by:	Pův. verze: Previous ver.:
v4	**added prescript for GD pump**	**PL01/12/2008**	**PL01/12/2008**	**TN01/12/2008**	**103**
v3	**fan system added**	**PL15/09/2008**	**PL15/09/2008**	**TN15/09/2008**	**102z1**

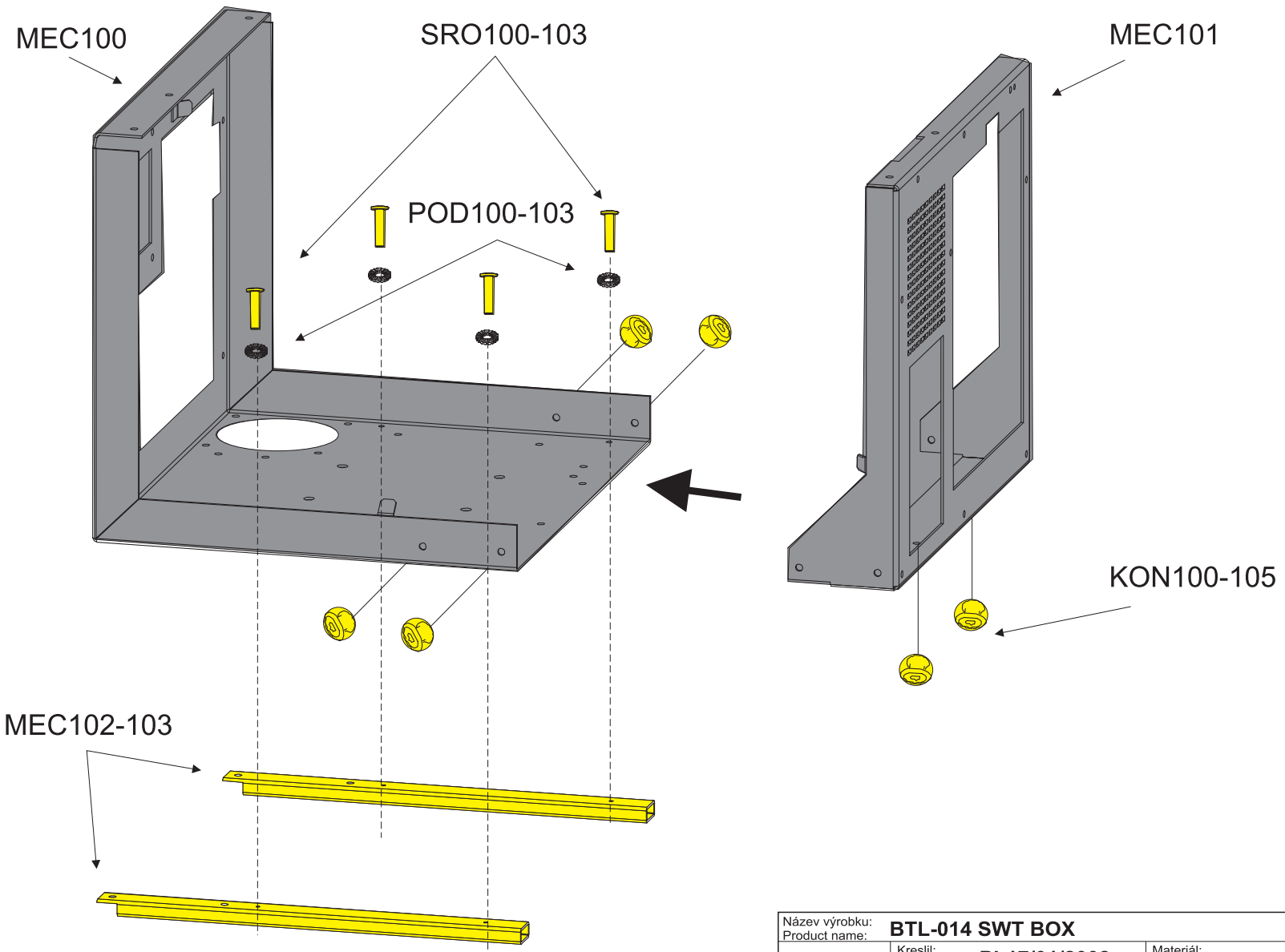
Název výrobku: Product name:	**BTL-014 SWT BOX**			
MEDICAL TECHNOLOGIES	Kreslil: Drown by: **PL17/01/2008**	Materiál: Material:		
	Konstr.: Designed by: **PL17/01/2008**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN17/01/2008**	List: Sheet: **1** z of **22**	Číslo výkresu: Sheet number:	**014-psswtbox104**

MAINS BOARD :



Název výrobku: Product name:	**BTL-014 SWT BOX**			
MEDICAL TECHNOLOGIES	Kreslil: Drown by: **PL17/01/2008**	Materiál: Material:		
	Konstr.: Designed by: **PL17/01/2008**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN17/01/2008**	List: Sheet: **2** z of **22**	Číslo výkresu: Sheet number: **014-psswtbox104**	

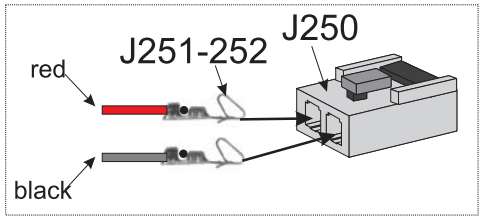
BASE FRAME:

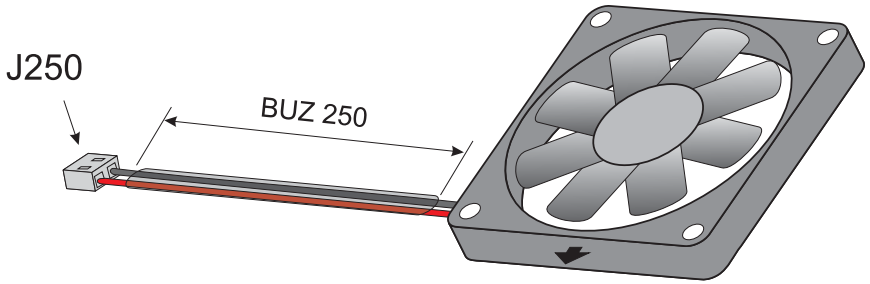


Název výrobku: Product name:	**BTL-014 SWT BOX**			
MEDICAL TECHNOLOGIES	Kreslil: Drown by: **PL17/01/2008**	Materiál: Material:		
	Konstr.: Designed by: **PL17/01/2008**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN17/01/2008**	List: Sheet: **3** z of **22**	Číslo výkresu: Sheet number: **014-psswtbox104**	

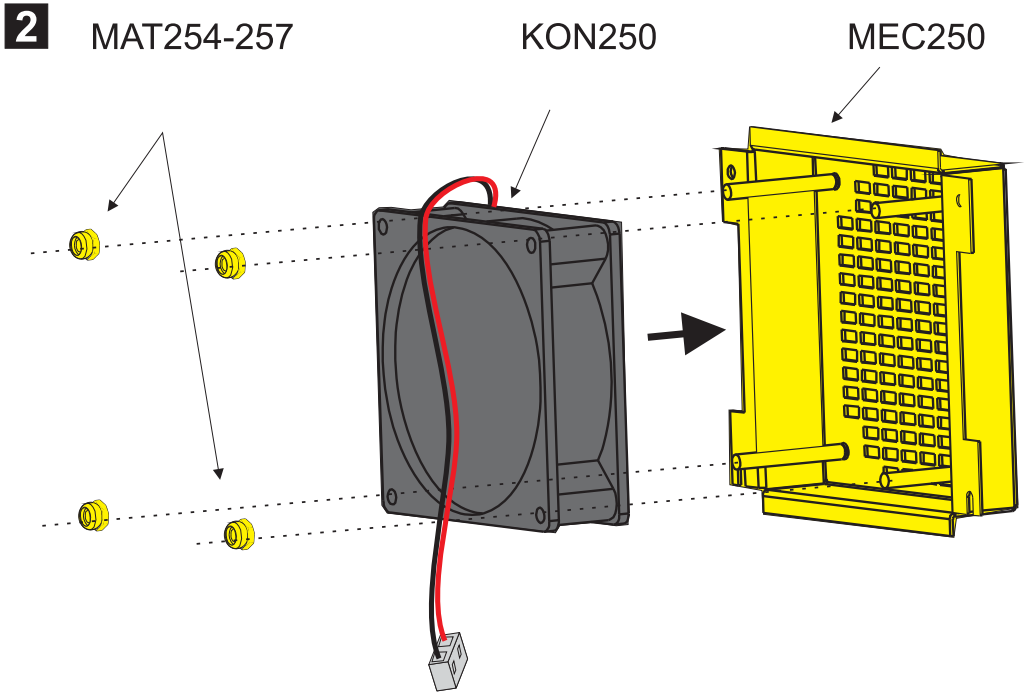
FAN SYSTEM:

1

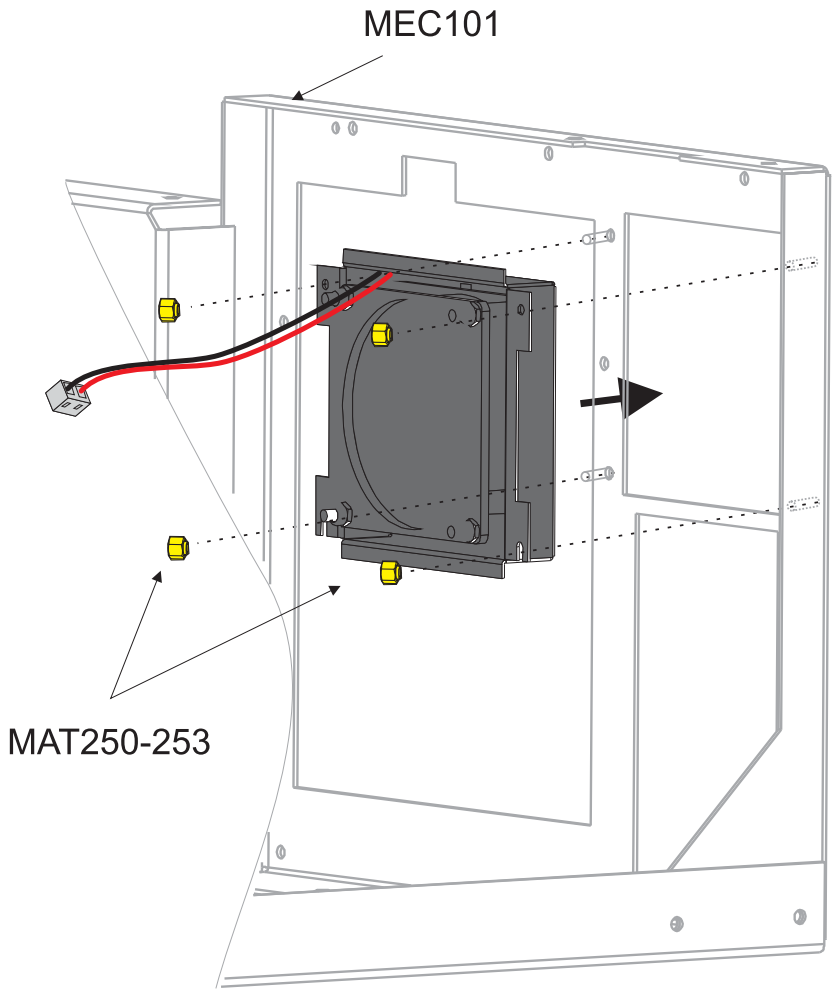




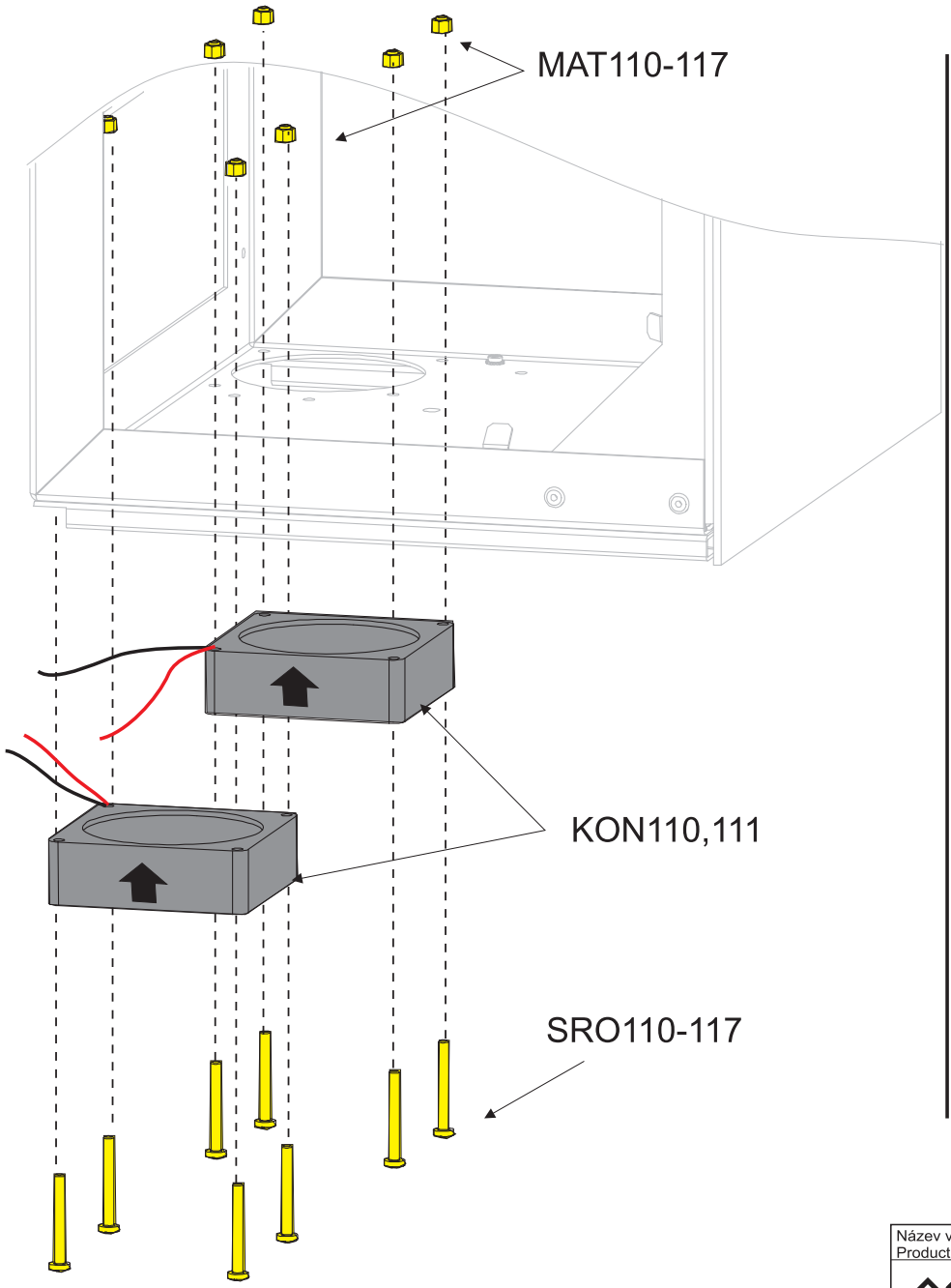
2



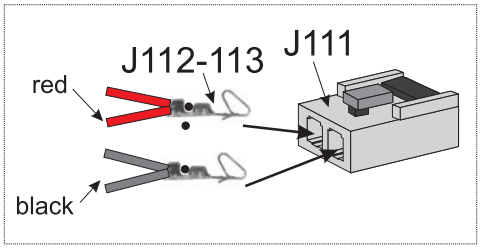
3

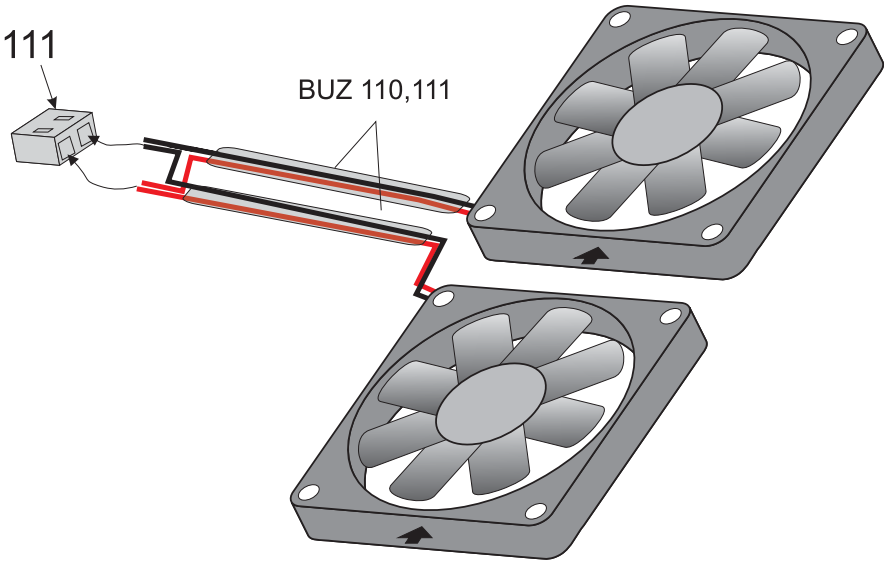


Název výrobku: Product name:	**BTL-014 SWT BOX**			
MEDICAL TECHNOLOGIES	Kreslil: Drown by: **PL17/01/2008**	Materiál: Material:		
	Konstr.: Designed by: **PL17/01/2008**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN17/01/2008**	List: Sheet: **4** z of **22**	Číslo výkresu: Sheet number:	**014-psswtbox104**



MODIFICATION OF FAN:

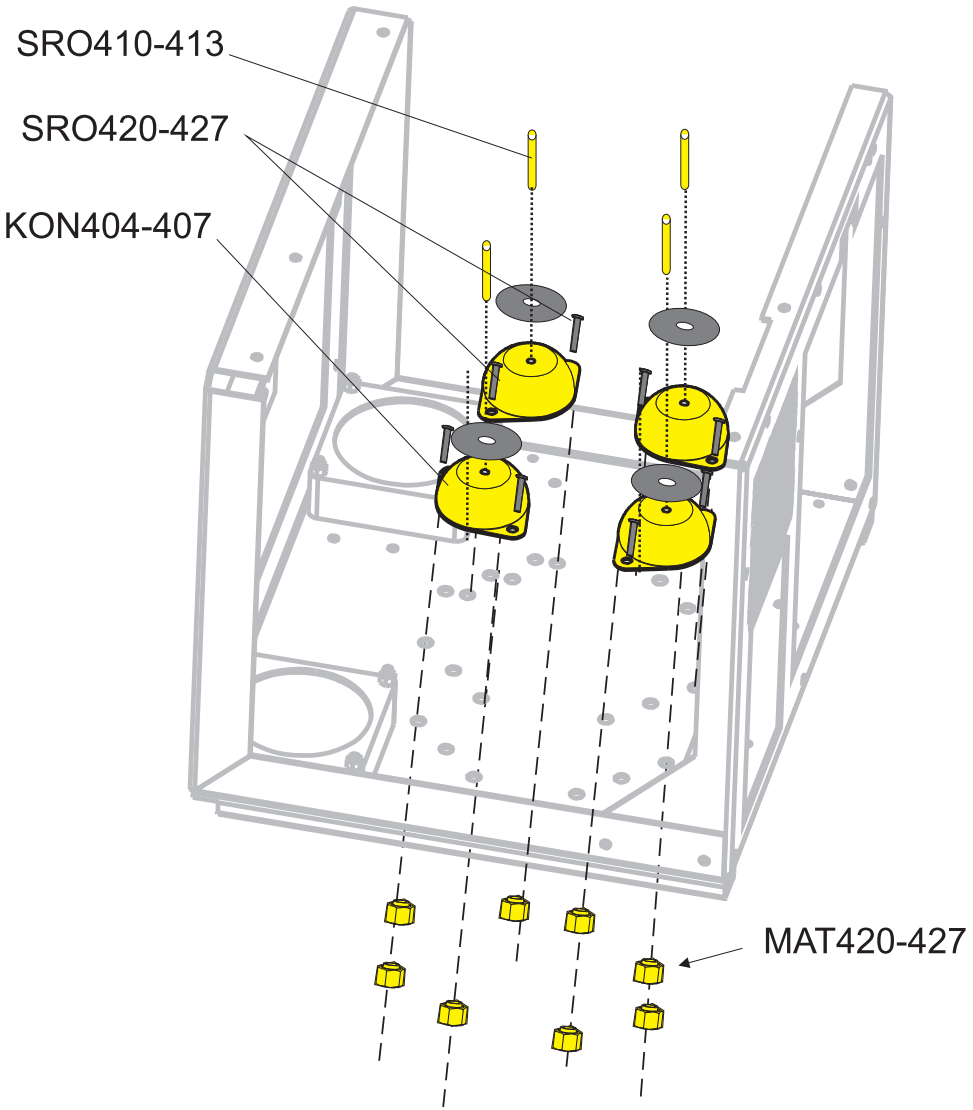




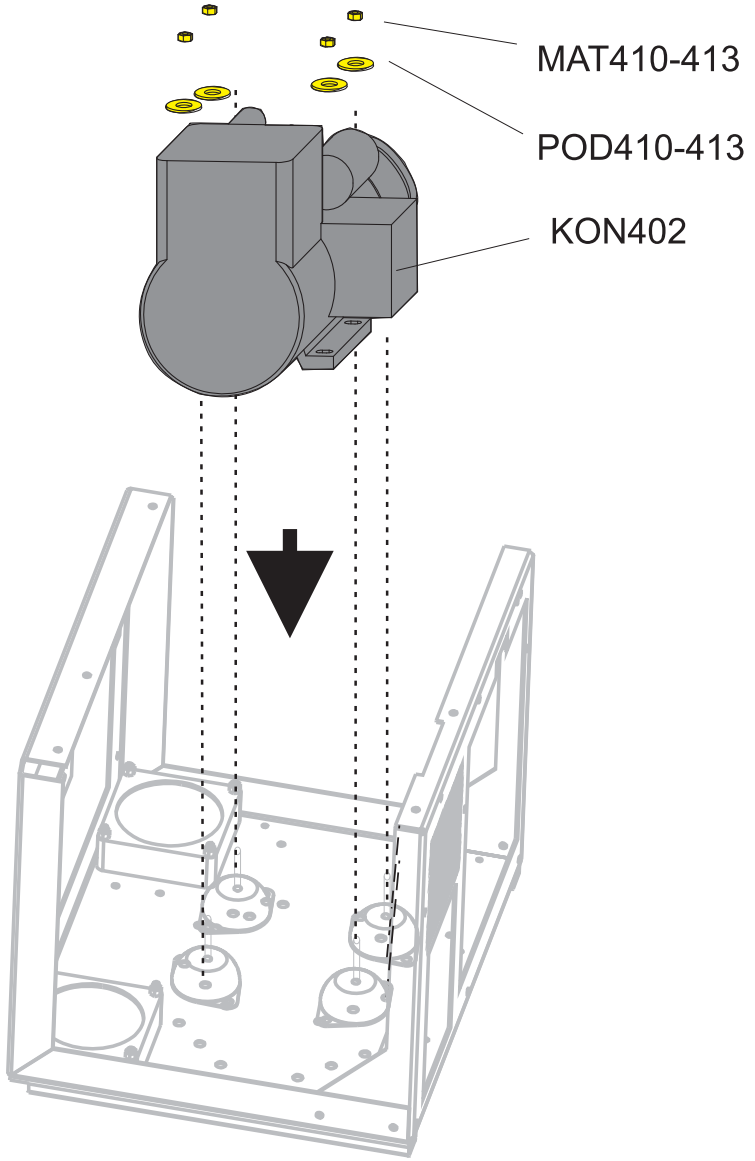
Název výrobku: Product name:	**BTL-014 SWT BOX**			
MEDICAL TECHNOLOGIES	Kreslil: Drown by: **PL17/01/2008**	Materiál: Material:		
	Konstr.: Designed by: **PL17/01/2008**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN17/01/2008**	List: Sheet: **5** z of **22**	Číslo výkresu: Sheet number:	**014-psswtbox104**

ASSY OF MEC400:
A) 014-PUMPSETDxxx

①



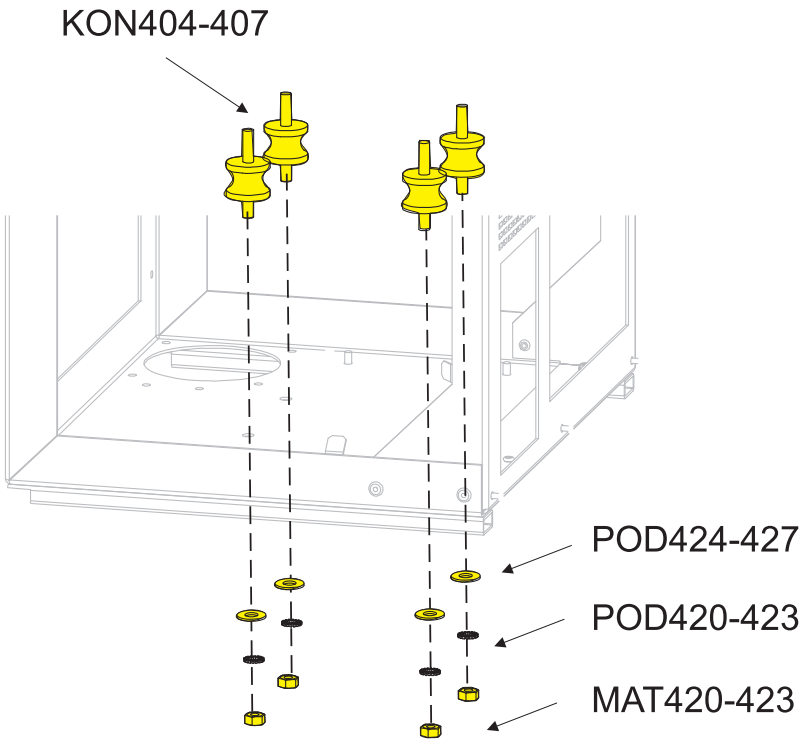
②



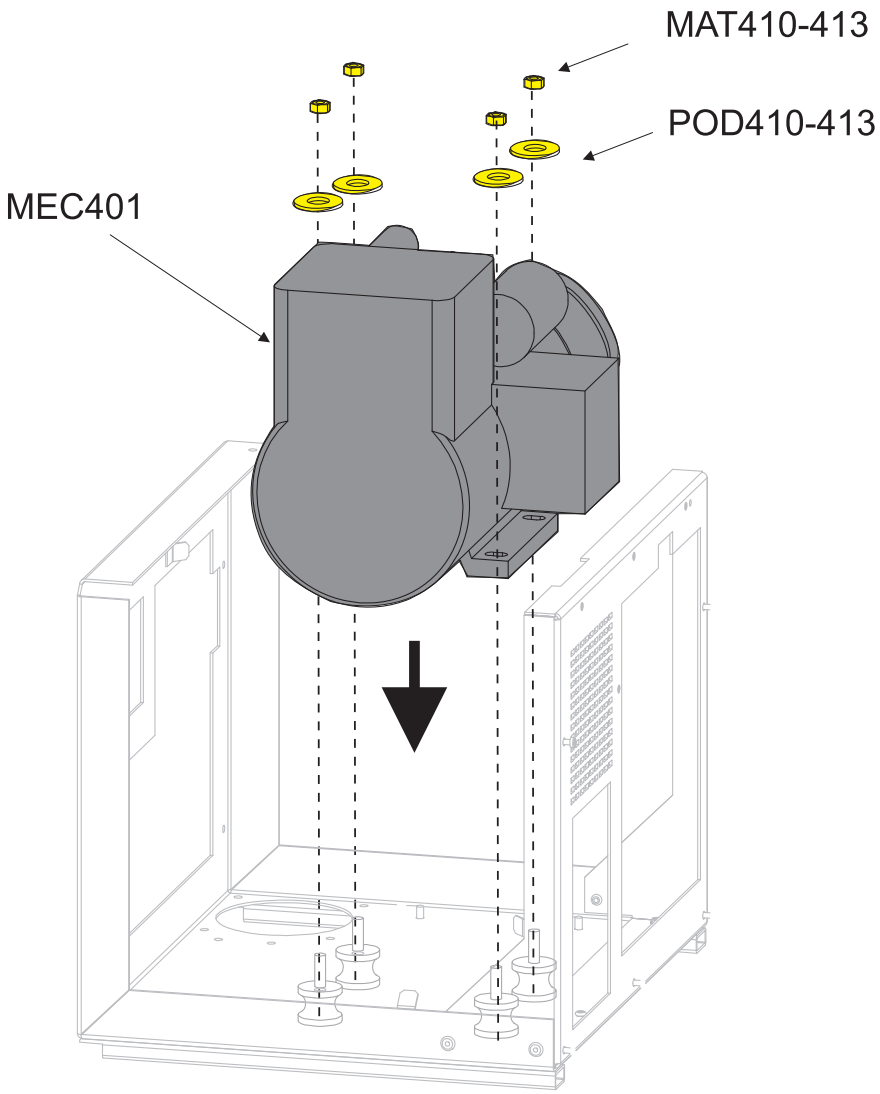
Název výrobku: Product name:	**BTL-014 SWT BOX**			
MEDICAL TECHNOLOGIES	Kreslil: Drown by: **PL17/01/2008**	Materiál: Material:		
	Konstr.: Designed by: **PL17/01/2008**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN17/01/2008**	List: Sheet: **6** z of **22**	Číslo výkresu: Sheet number: **014-psswtbox104**	

ASSY OF MEC400:
B) 014-PUMPSETGXXX

①



②

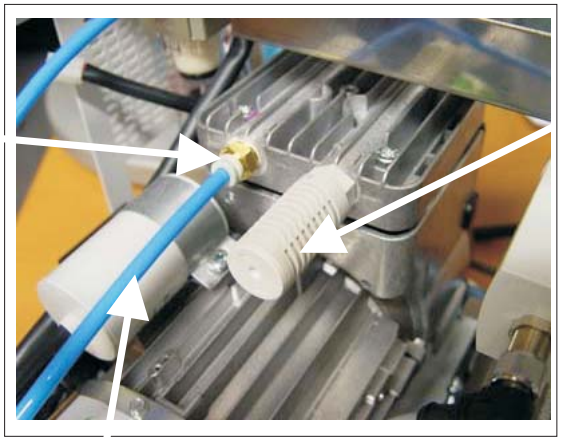


Název výrobku: Product name:	**BTL-014 SWT BOX**			
MEDICAL TECHNOLOGIES	Kreslil: Drown by: **PL17/01/2008**	Materiál: Material:		
	Konstr.: Designed by: **PL17/01/2008**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN17/01/2008**	List: Sheet: **7** z of **22**	Číslo výkresu: Sheet number: **014-psswtbox104**	

ASSY OF MEC400:

③

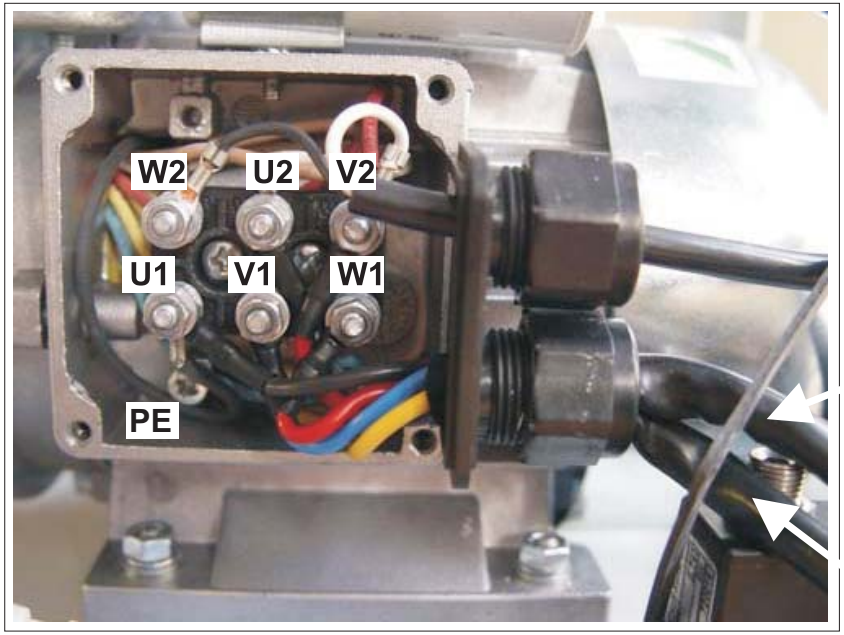
MEC400
(KON401)



MEC400
(KON403)

MEC400
A)for 014-PUMPSETDxxx: L=350mm (HAD401)
B) for 014-PUMPSETGxxx: L=520mm (HAD401)

MOTOR CONFIGURATION Duerr T.:



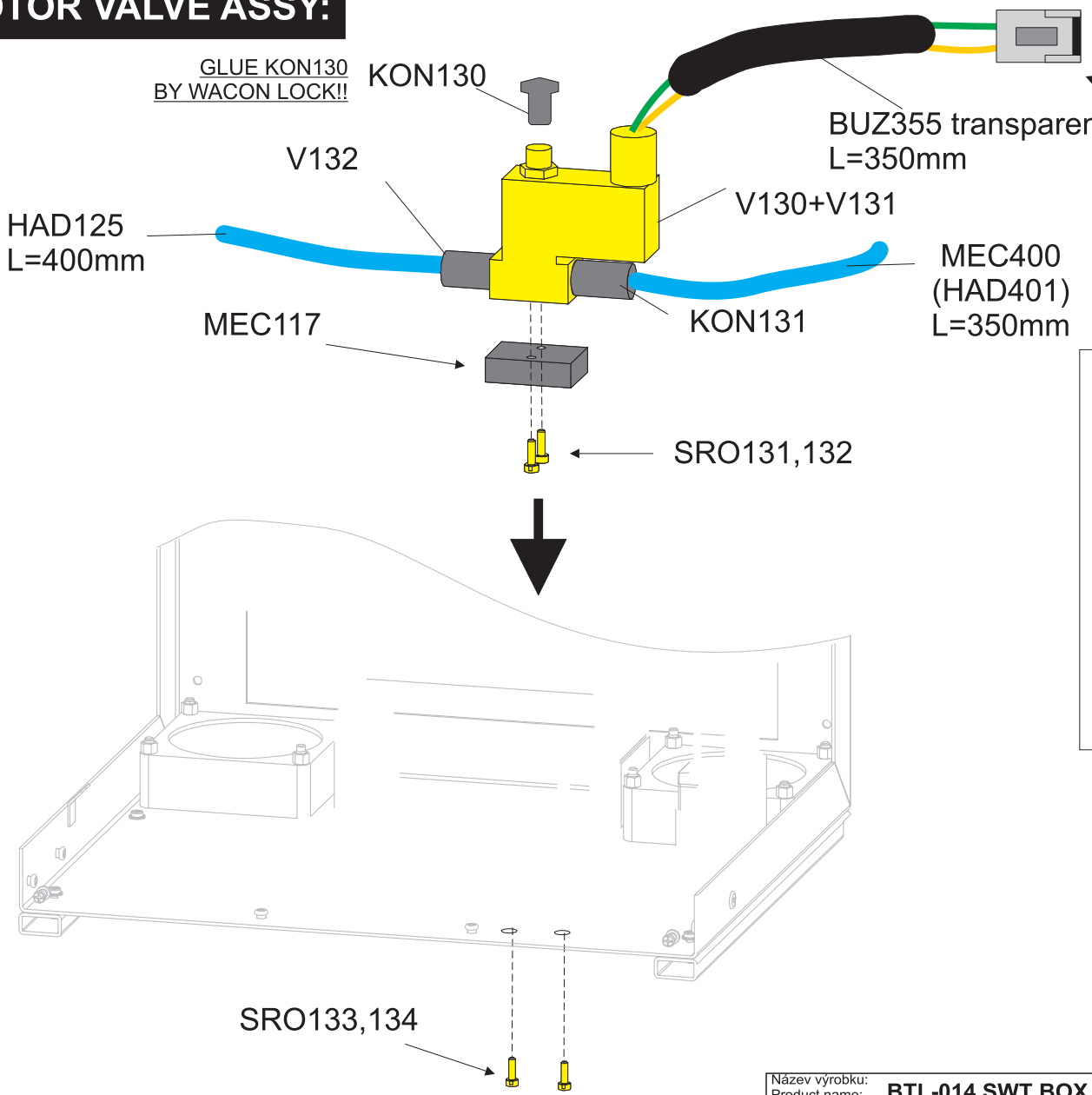
MEC400
(MEC402)

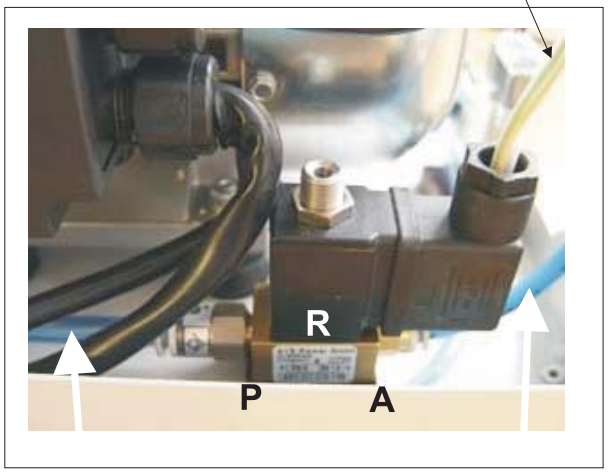
MEC400
(MEC403)

REF	WIRE COLOR	MOTOR LINK
MEC402	black	U2
	blue	V1
	red	V2
	yellow	PE
MEC403	black	U1
	brown	W1

Název výrobku: Product name:	**BTL-014 SWT BOX**			
BTL MEDICAL TECHNOLOGIES	Kreslil: Drown by: **PL17/01/2008**	Materiál: Material:		
	Konstr.: Designed by: **PL17/01/2008**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN17/01/2008**	List: Sheet: **8** z of **22**	Číslo výkresu: Sheet number: **014-psswtbox104**	

MOTOR VALVE ASSY:



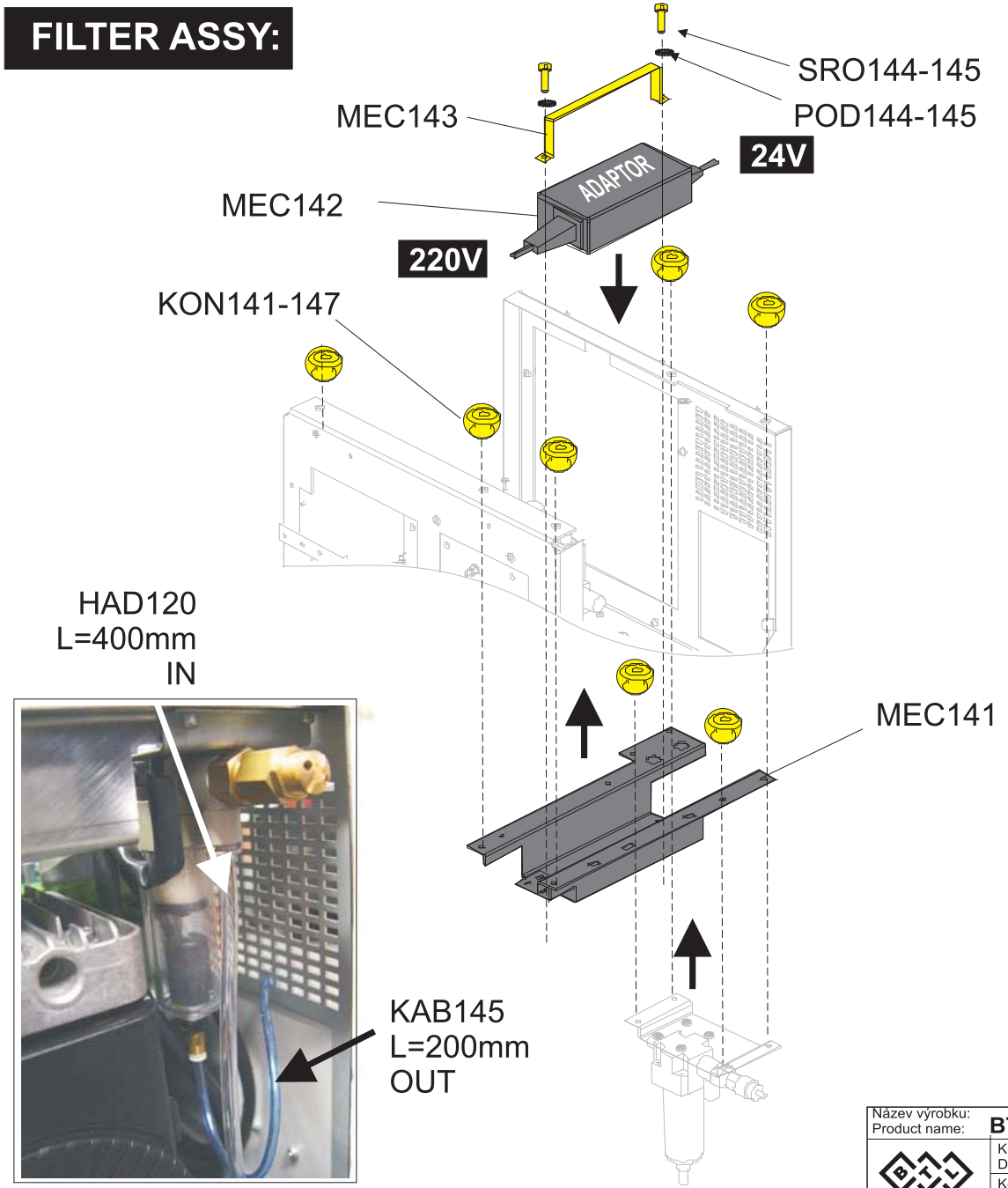


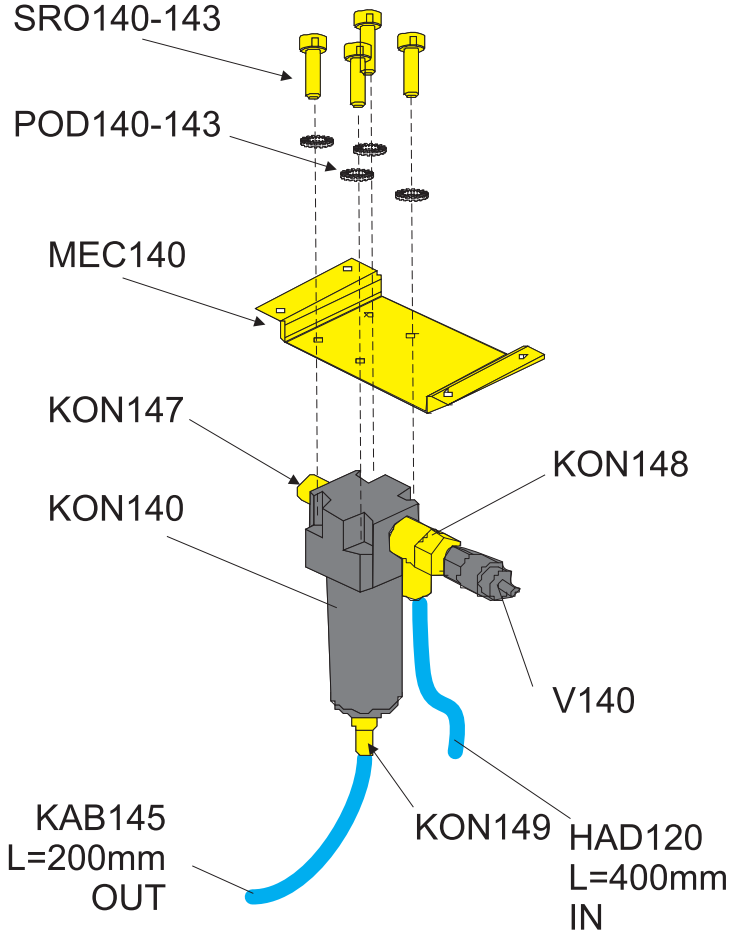
HAD125
L=340mm

MEC400
(HAD401)
L=350mm

Název výrobku: Product name:	**BTL-014 SWT BOX**			
MEDICAL TECHNOLOGIES	Kreslil: Drown by: **PL17/01/2008**	Materiál: Material:		
	Konstr.: Designed by: **PL17/01/2008**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN17/01/2008**	List: Sheet: **9** z of **22**	Číslo výkresu: Sheet number:	**014-psswtbox104**

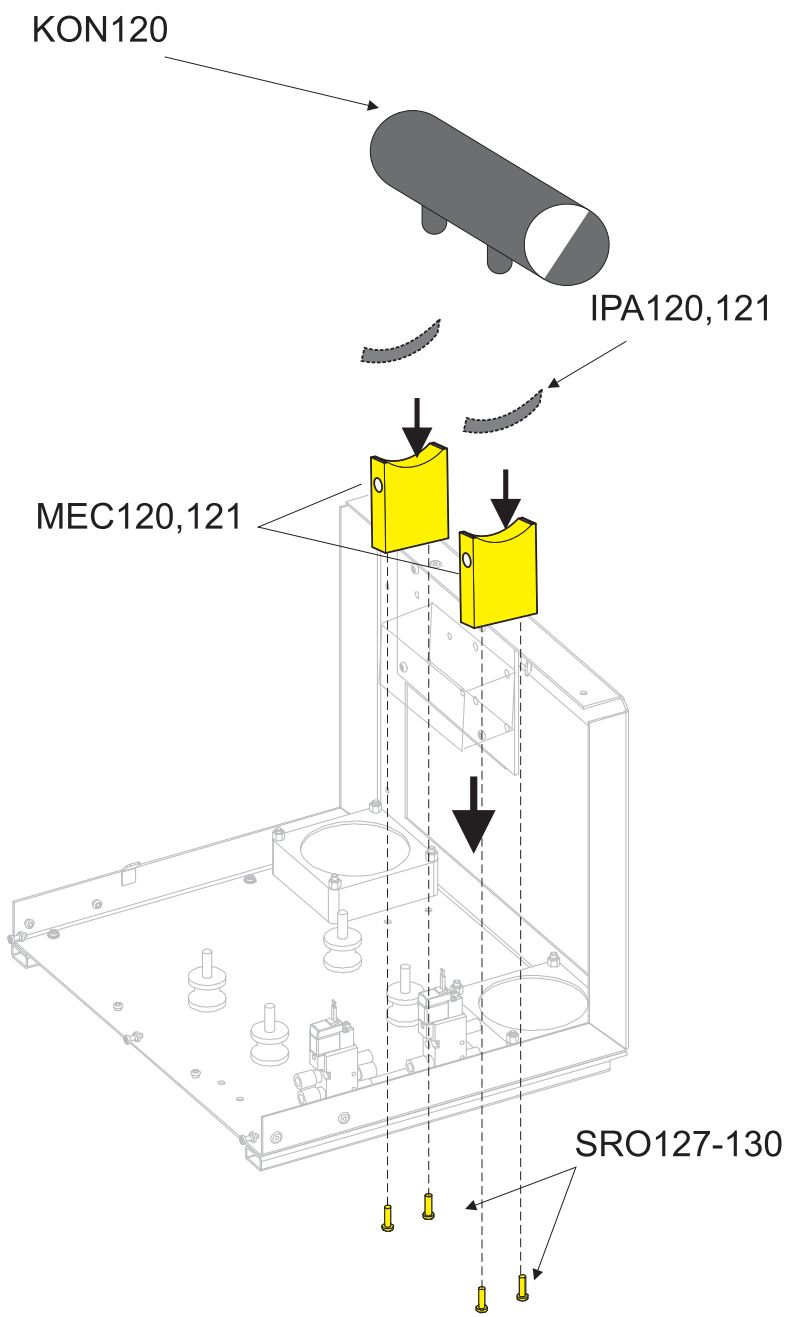
FILTER ASSY:

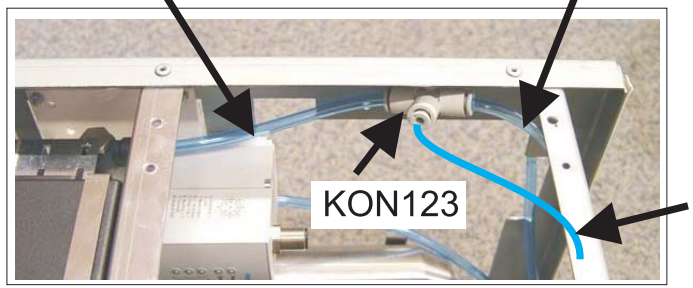


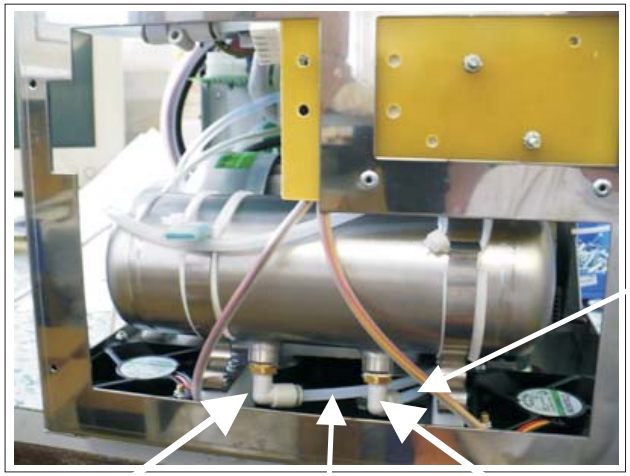


Název výrobku: Product name:	**BTL-014 SWT BOX**				
MEDICAL TECHNOLOGIES	Kreslil: Drown by: **PL17/01/2008**	Materiál: Material:			
	Konstr.: Designed by: **PL17/01/2008**	Povrch. úprava: Surface finish:		Měřítko: Scale:	
	Schválil: Approved by: **TN17/01/2008**	List: Sheet: **10** of **22**	Číslo výkresu: Sheet number:	**014-psswtbox104**	

AIR TANK ASSY:

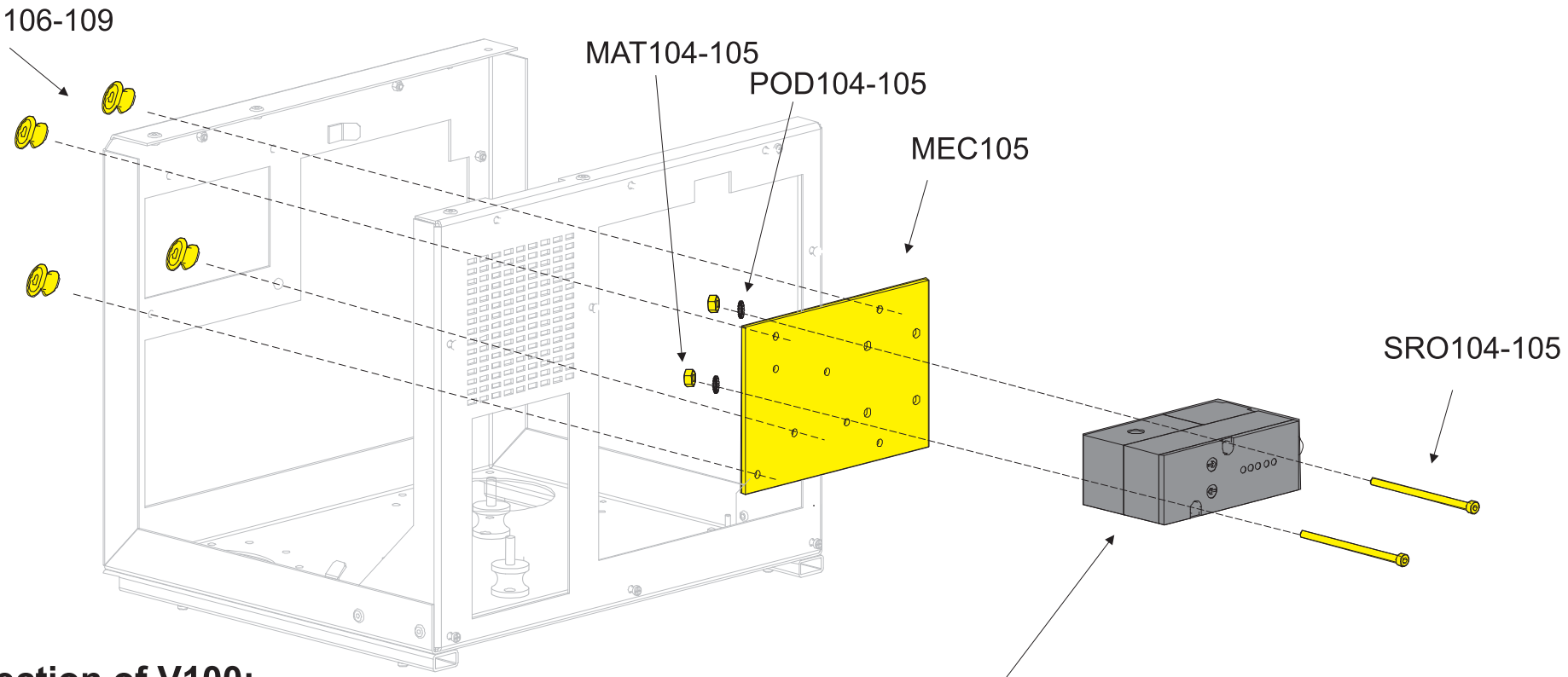




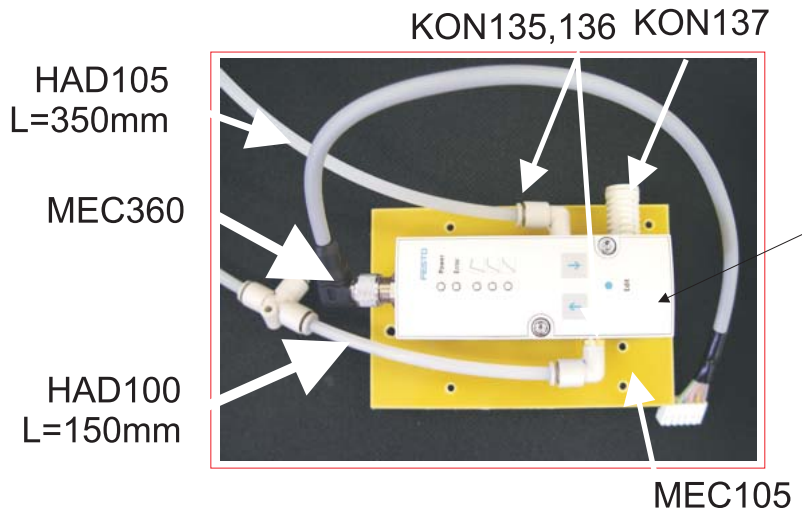


Název výrobku: Product name:	**BTL-014 SWT BOX**			
MEDICAL TECHNOLOGIES	Kreslil: Drown by: **PL17/01/2008**	Materiál: Material:		
	Konstr.: Designed by: **PL17/01/2008**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN17/01/2008**	List: Sheet: **11** z of **22**	Číslo výkresu: Sheet number: **014-psswtbox104**	

E/P VALVE:



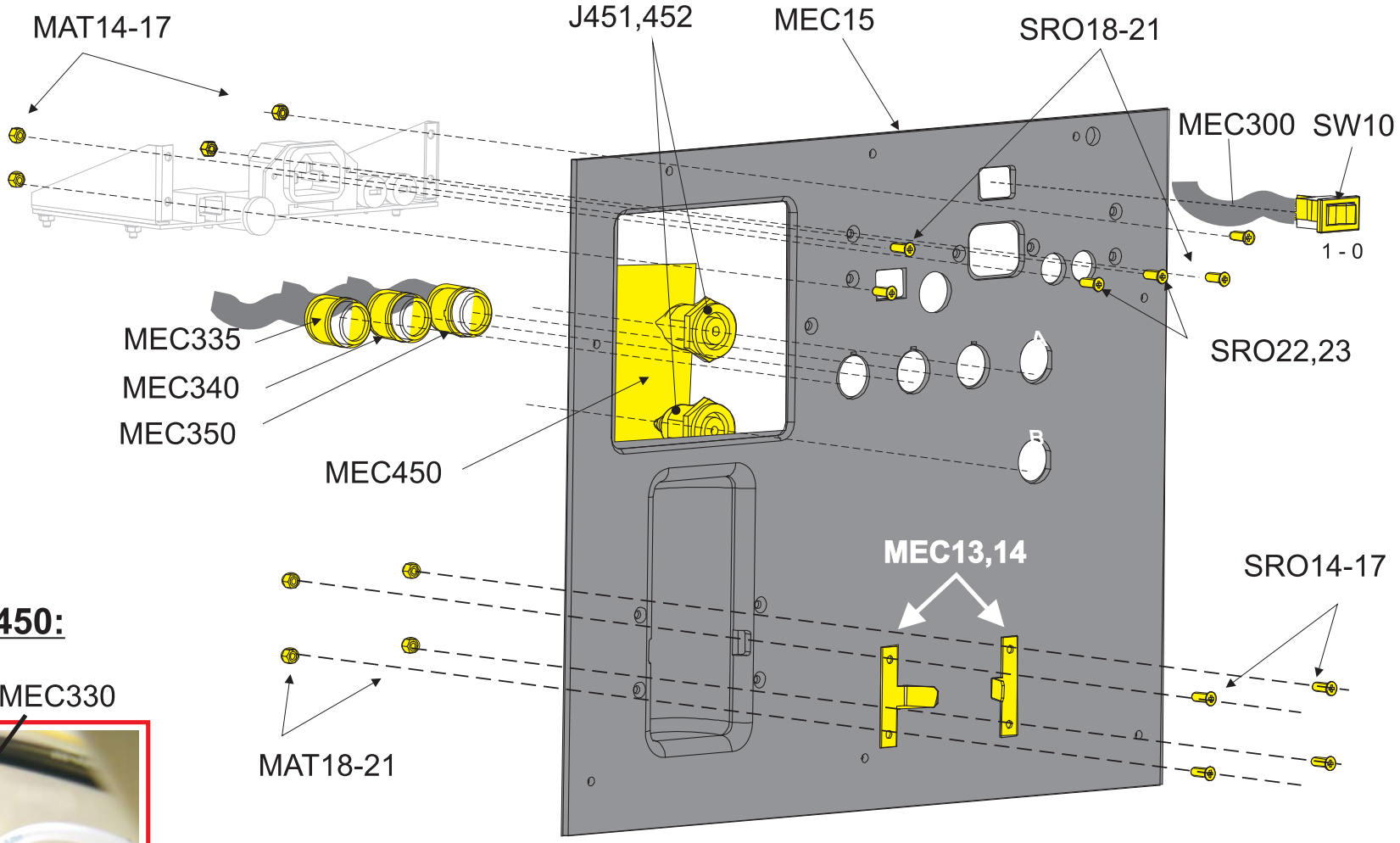
Connection of V100:



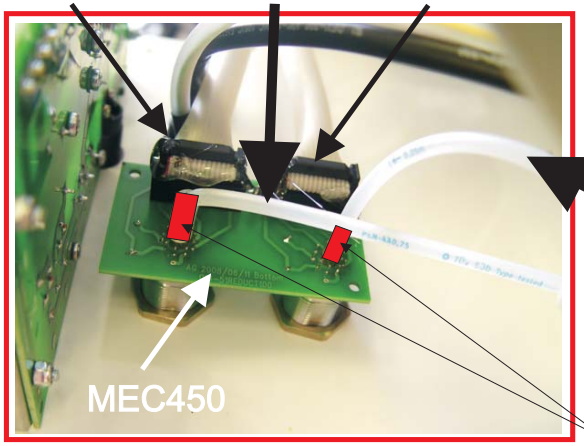
Název výrobku: Product name:	**BTL-014 SWT BOX**			
MEDICAL TECHNOLOGIES	Kreslil: Drown by: **PL17/01/2008**	Materiál: Material:		
	Konstr.: Designed by: **PL17/01/2008**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN17/01/2008**	List: Sheet: **12** of **22**	Číslo výkresu: Sheet number: **014-psswtbox104**	

REAR PANEL:

Placement of MEC325, 330:

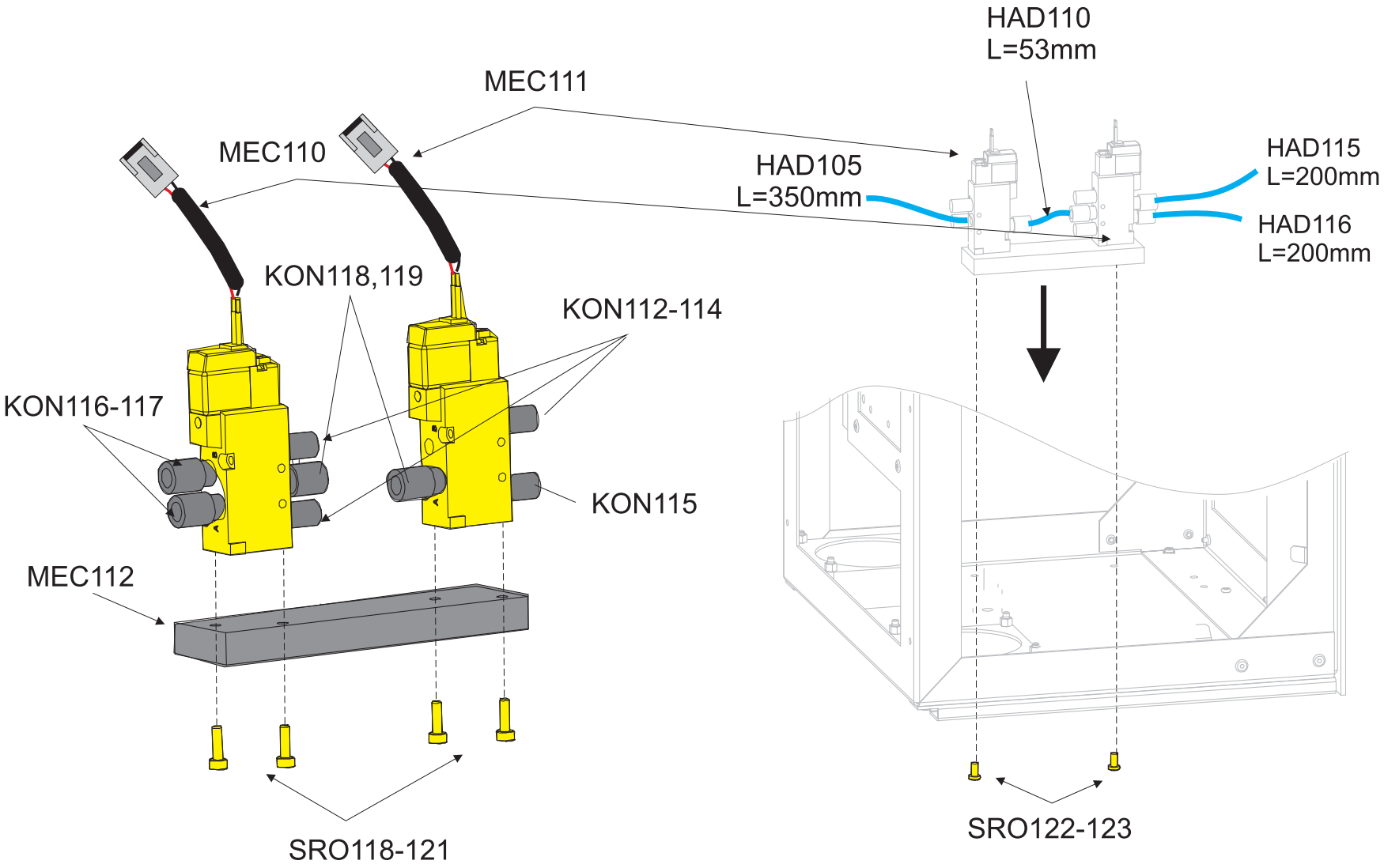


Placement of reducT board MEC450:



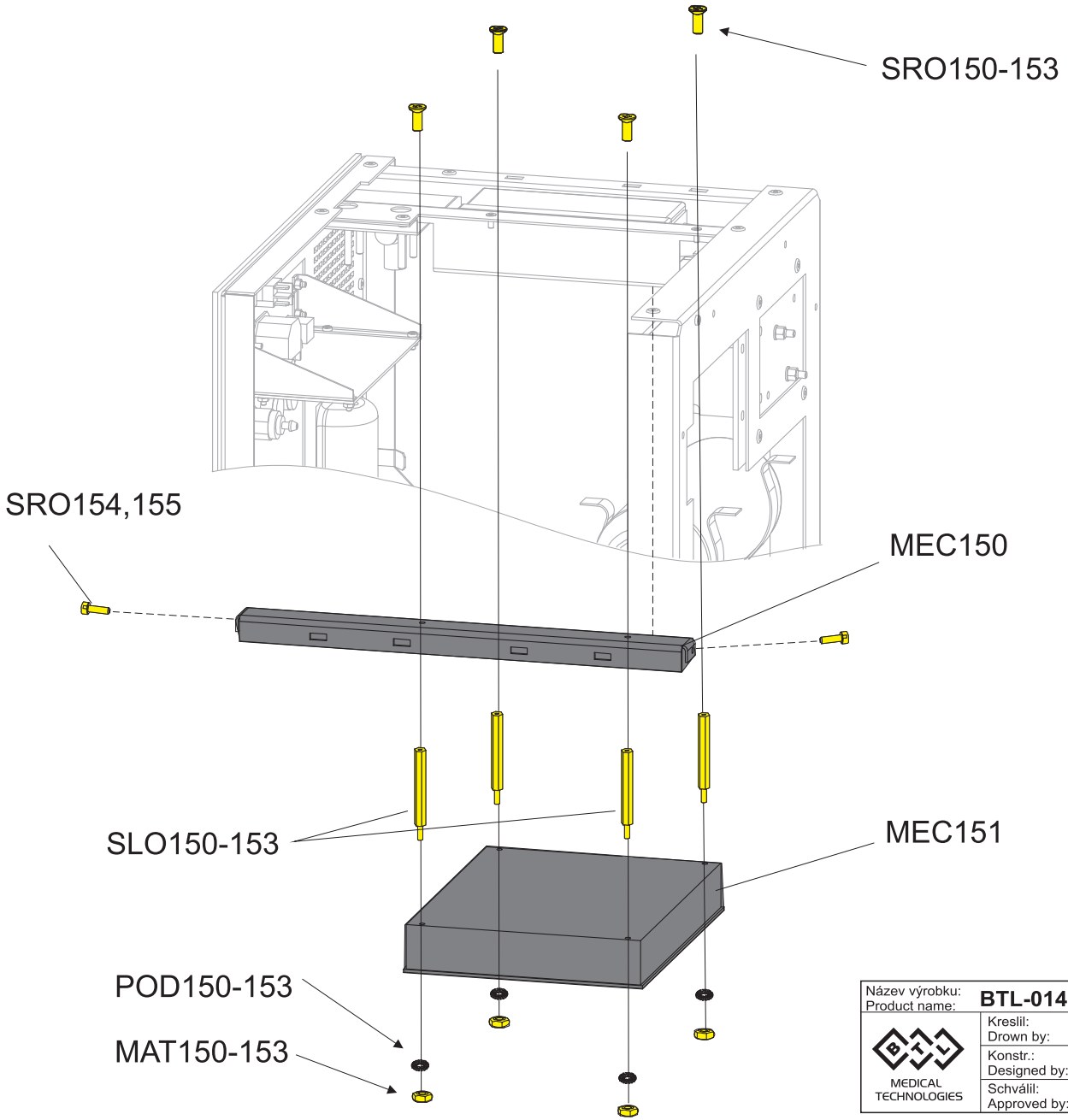
Název výrobku: Product name:	**BTL-014 SWT BOX**			
MEDICAL TECHNOLOGIES	Kreslil: Drown by: **PL17/01/2008**	Materiál: Material:		
	Konstr.: Designed by: **PL17/01/2008**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN17/01/2008**	List: Sheet: **13** of **22**	Číslo výkresu: Sheet number:	**014-psswtbox104**

3/2 AND 5/2 VALVE ASSY:

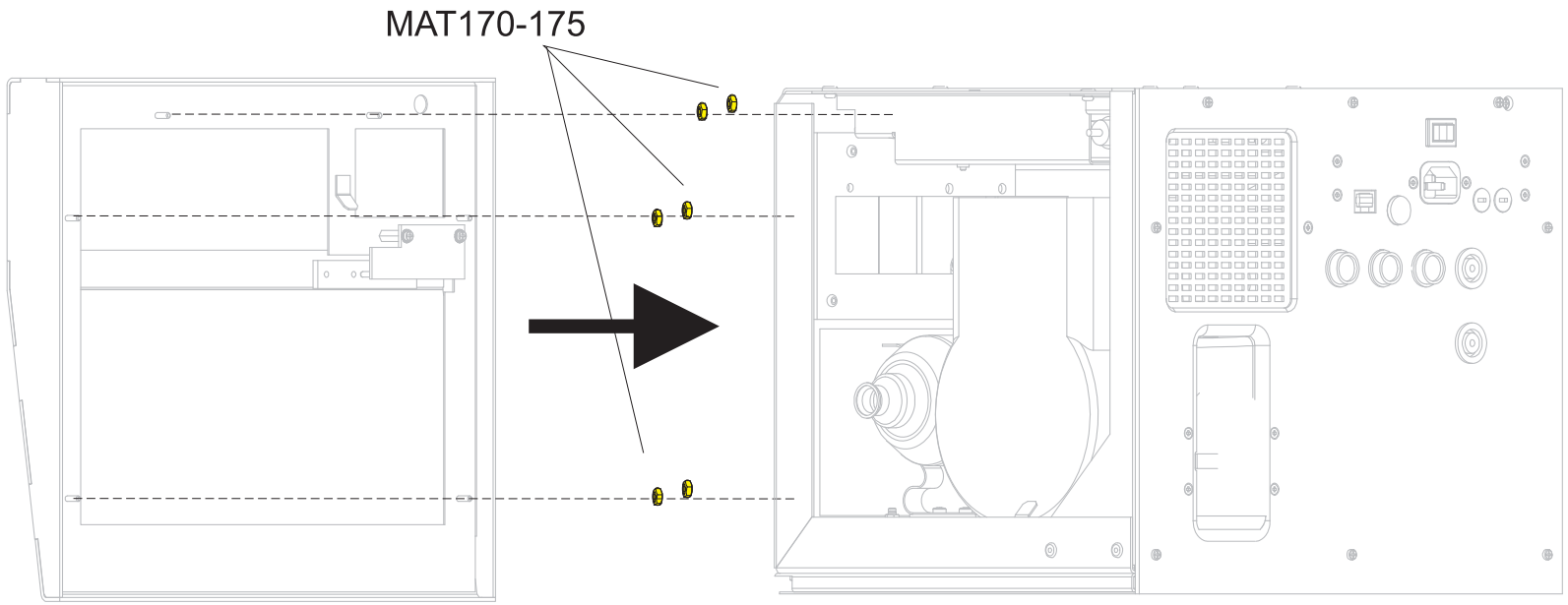


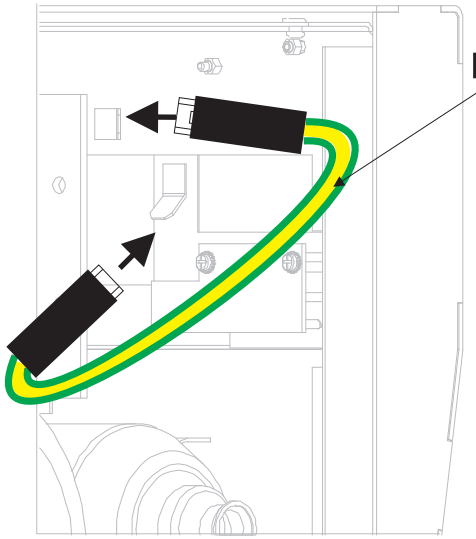
Název výrobku: Product name:	**BTL-014 SWT BOX**			
MEDICAL TECHNOLOGIES	Kreslil: Drown by: **PL17/01/2008**	Materiál: Material:		
	Konstr.: Designed by: **PL17/01/2008**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN17/01/2008**	List: Sheet: **14** of **22**	Číslo výkresu: Sheet number: **014-psswtbox104**	

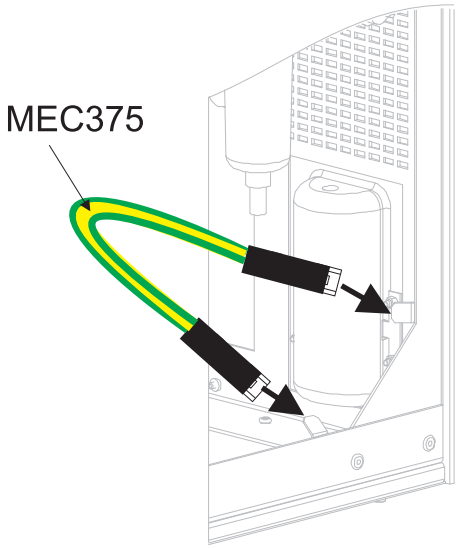
GENPNEU 1xx BOARD ASSY:



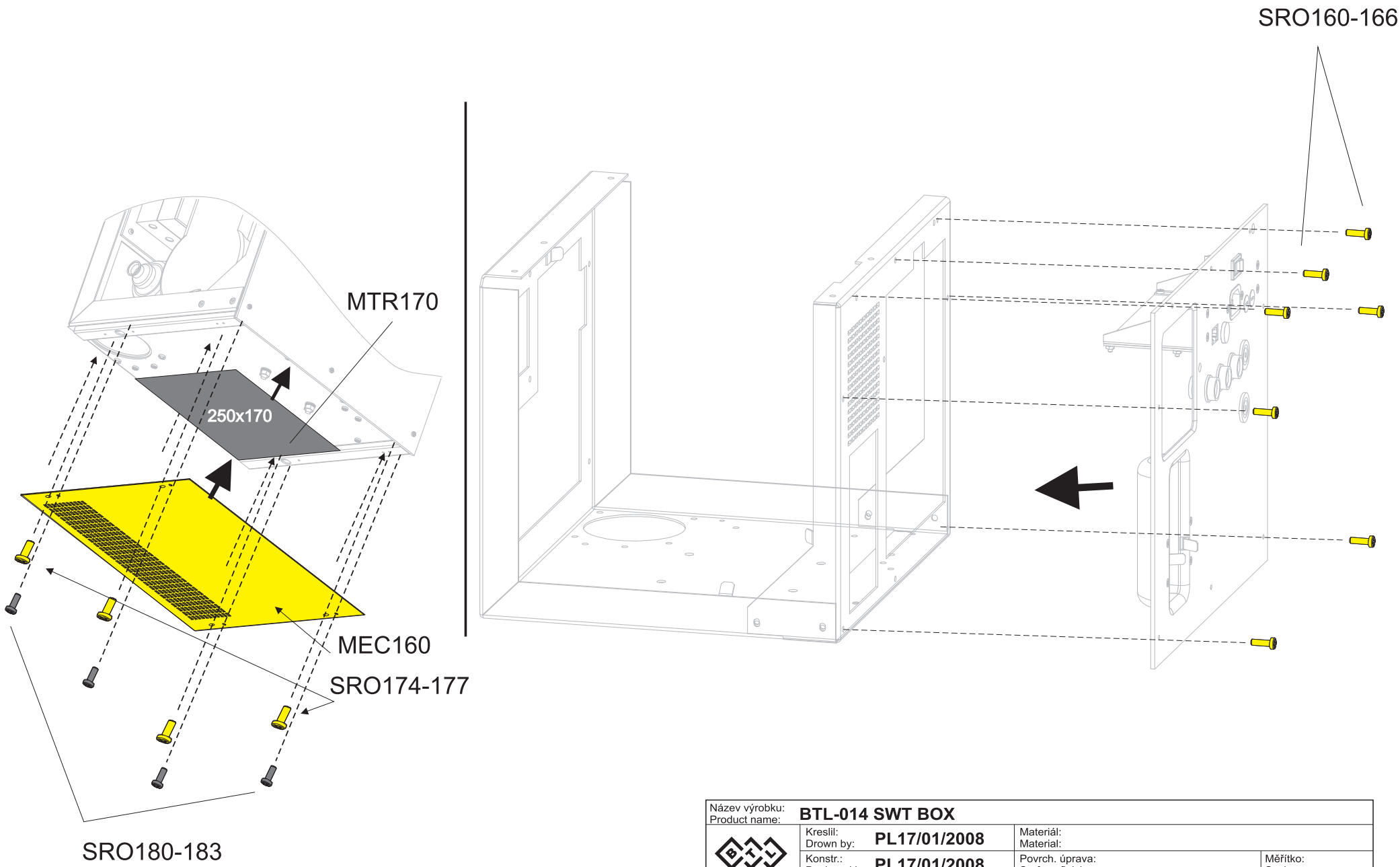
Název výrobku: Product name:	**BTL-014 SWT BOX**			
MEDICAL TECHNOLOGIES	Kreslil: Drown by: **PL17/01/2008**	Materiál: Material:		
	Konstr.: Designed by: **PL17/01/2008**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN17/01/2008**	List: Sheet: **15** of **22**	Číslo výkresu: Sheet number:	**014-psswtbox104**



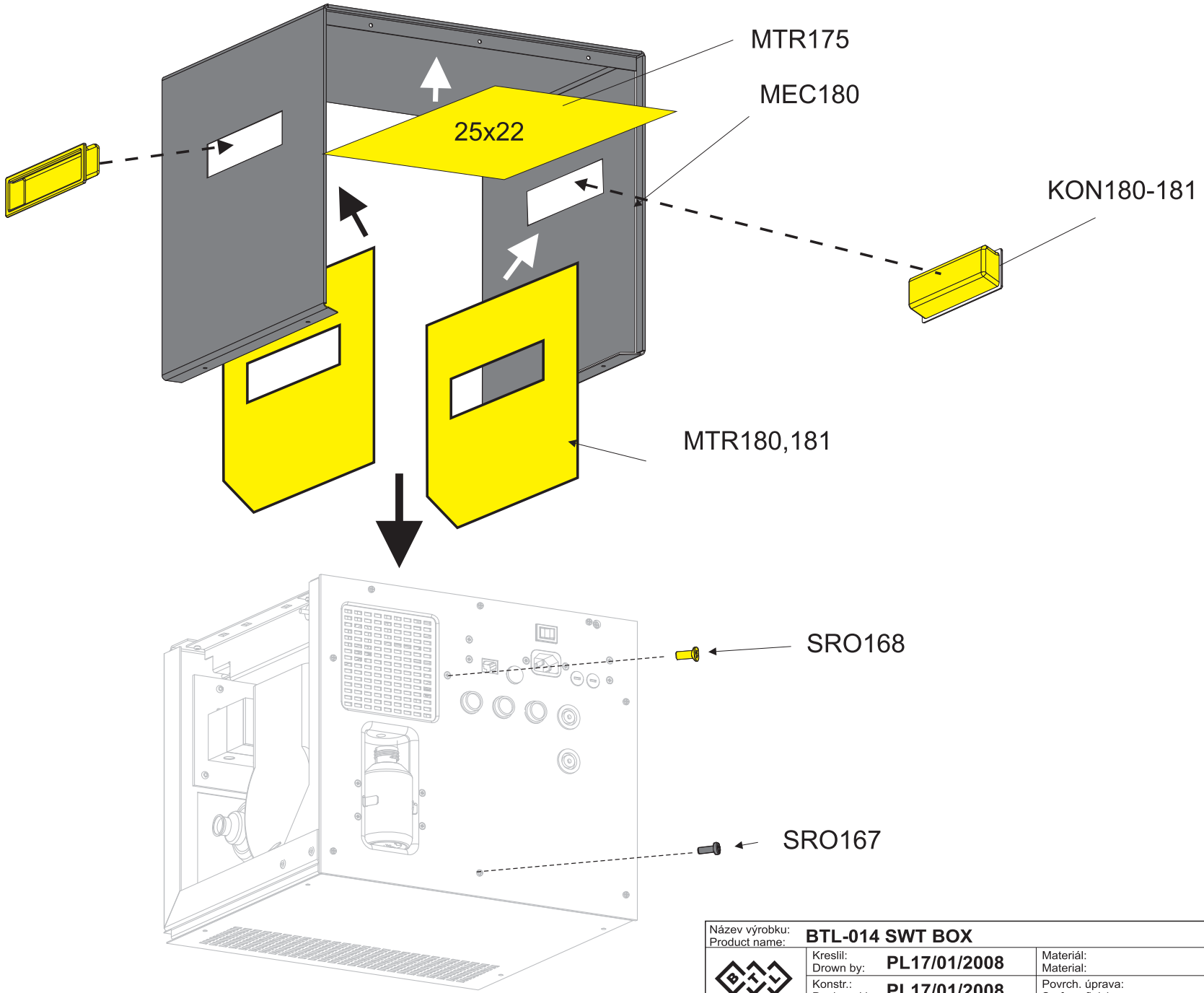




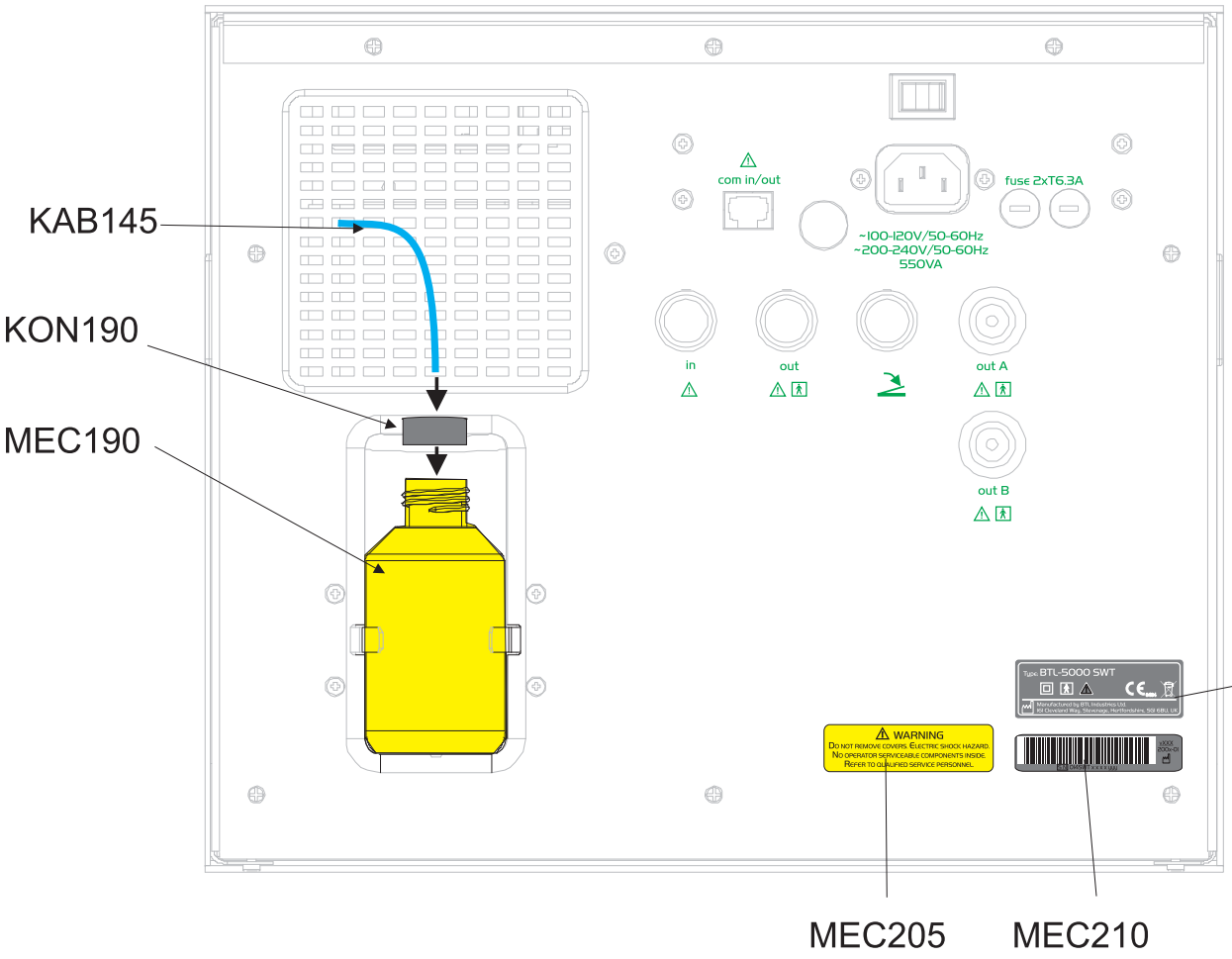
Název výrobku: Product name:	**BTL-014 SWT BOX**			
MEDICAL TECHNOLOGIES	Kreslil: Drown by: **PL17/01/2008**	Materiál: Material:		
	Konstr.: Designed by: **PL17/01/2008**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN17/01/2008**	List: Sheet: **16** z of **22**	Číslo výkresu: Sheet number:	**014-psswtbox104**

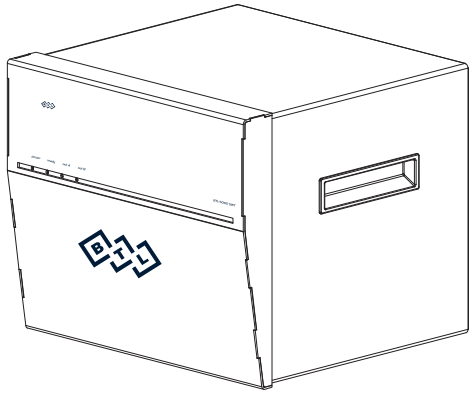


Název výrobku: Product name:	**BTL-014 SWT BOX**			
MEDICAL TECHNOLOGIES	Kreslil: Drown by: **PL17/01/2008**	Materiál: Material:		
	Konstr.: Designed by: **PL17/01/2008**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN17/01/2008**	List: Sheet: **17** z of **22**	Číslo výkresu: Sheet number: **014-psswtbox104**	



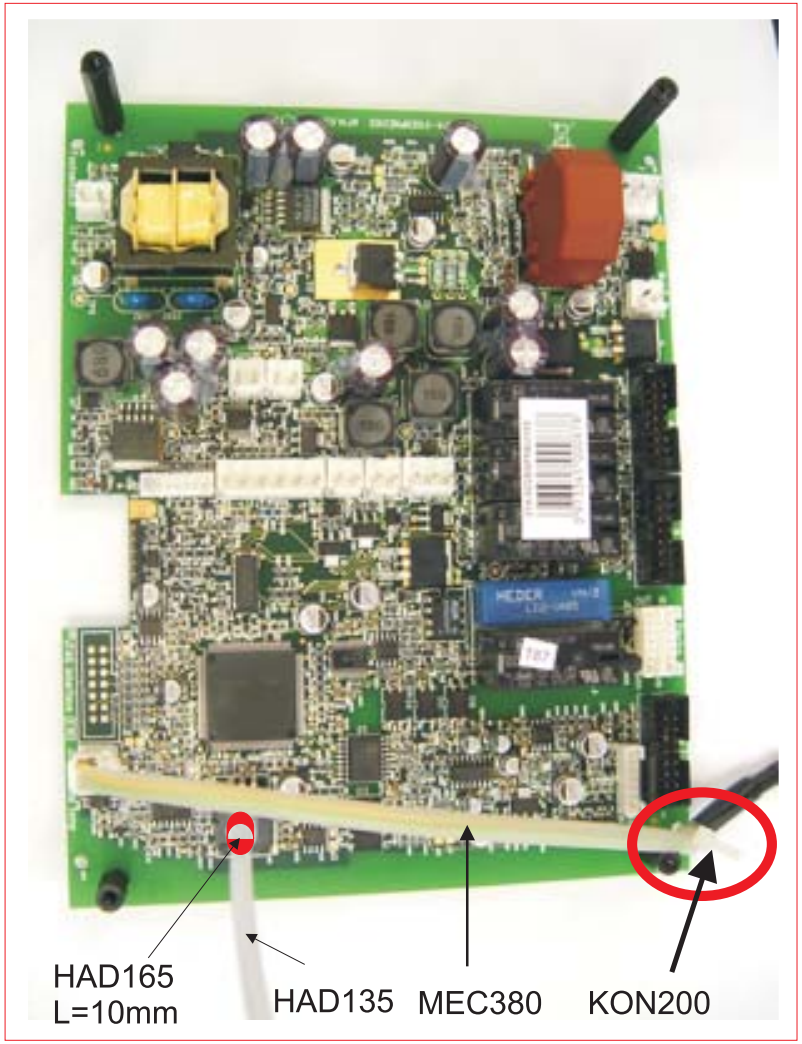
Název výrobku: Product name:	**BTL-014 SWT BOX**			
MEDICAL TECHNOLOGIES	Kreslil: Drown by: **PL17/01/2008**	Materiál: Material:		
	Konstr.: Designed by: **PL17/01/2008**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN17/01/2008**	List: Sheet: **18** z of **22**	Číslo výkresu: Sheet number: **014-psswtbox104**	



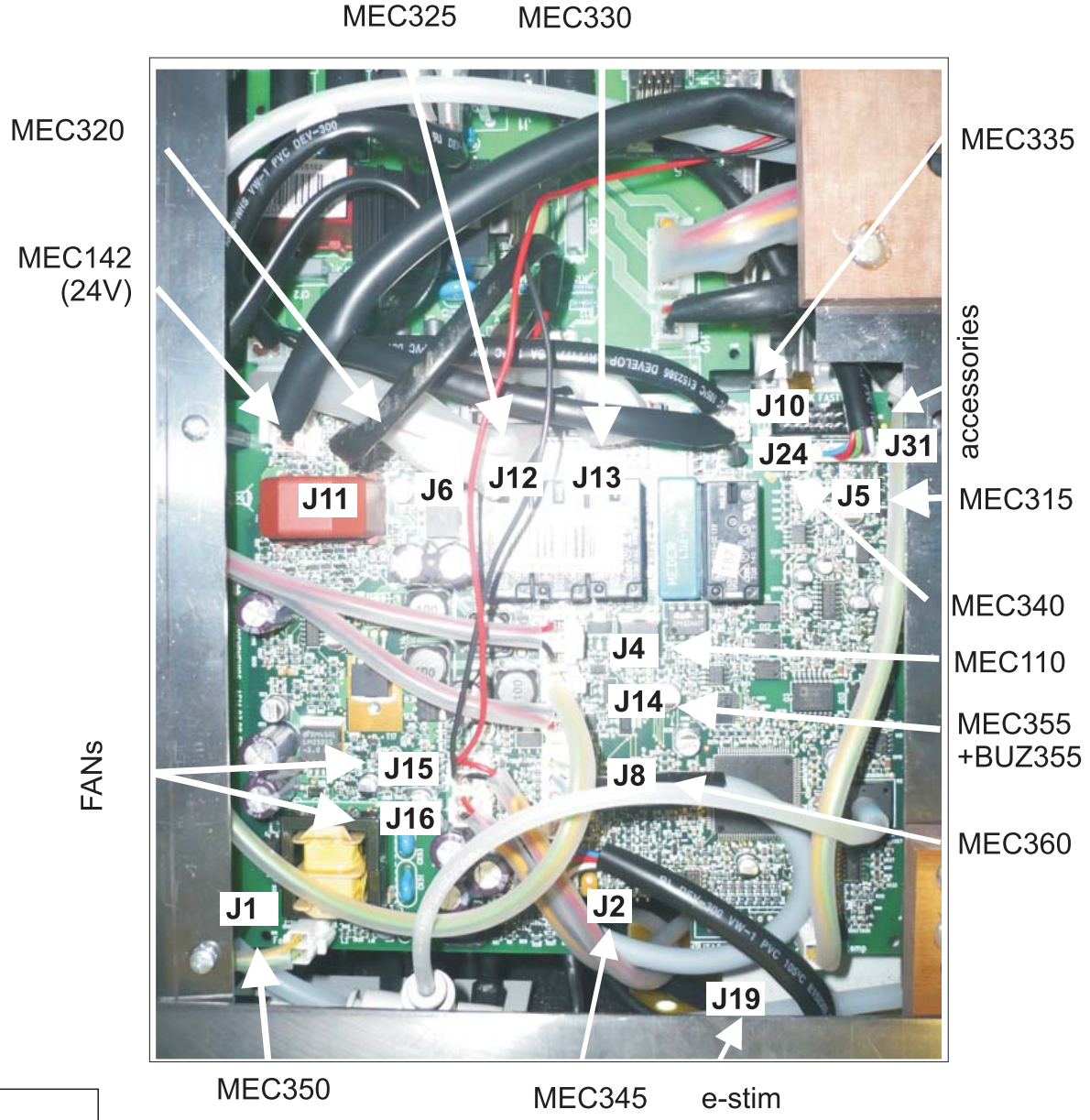


Název výrobku: Product name:	**BTL-014 SWT BOX**			
MEDICAL TECHNOLOGIES	Kreslil: Drown by: **PL17/01/2008**	Materiál: Material:		
	Konstr.: Designed by: **PL17/01/2008**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN17/01/2008**	List: Sheet: **19** of **22**	Číslo výkresu: Sheet number: **014-psswtbox104**	

CONNECTION OF GENPNEU 1xx BOARD:



GENPNEU BOARD (MEC151):

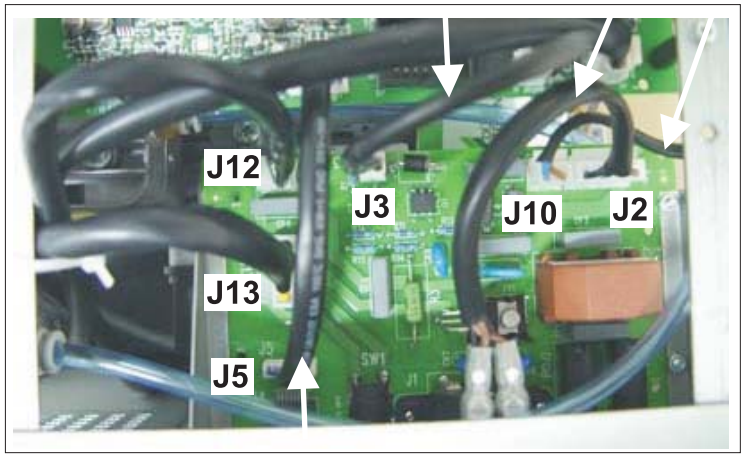


Název výrobku: Product name:	**BTL-014 SWT BOX**			
MEDICAL TECHNOLOGIES	Kreslil: Drown by: **PL17/01/2008**	Materiál: Material:		
	Konstr.: Designed by: **PL17/01/2008**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN17/01/2008**	List: Sheet: **20** z of **22**	Číslo výkresu: Sheet number:	**014-psswtbox104**

CONNECTION OF MAINS 1xx BOARD:

MAINS BOARD (MEC12):

MEC320 MEC300 MEC142 (220V)

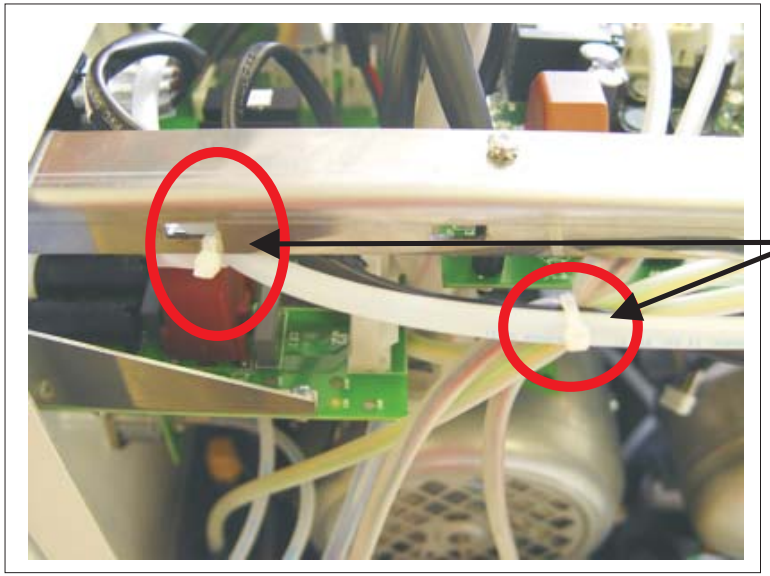


MEC315

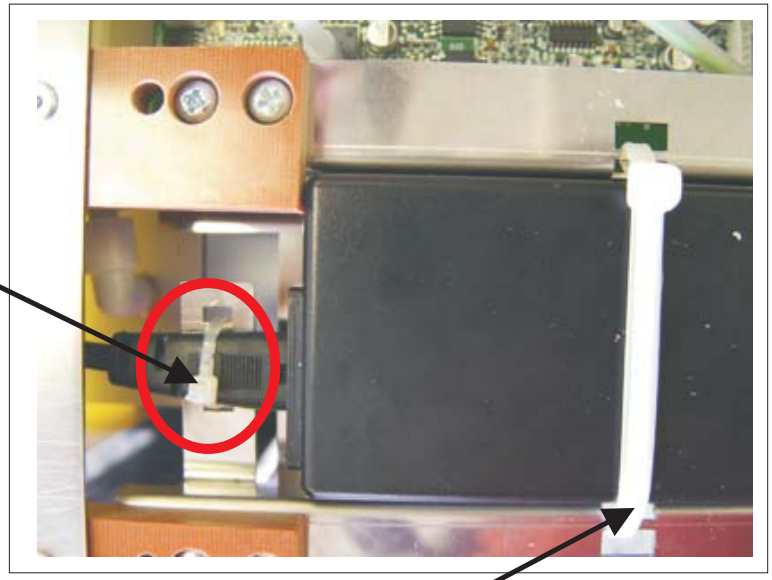
Ref./Ref.	J12	J3	J10	J2	J13	J5
MEC142			●			
MEC300				●		
MEC305					●	
MEC310	●					
MEC315						●
MEC320		●				

Název výrobku: Product name:	**BTL-014 SWT BOX**			
MEDICAL TECHNOLOGIES	Kreslil: Drown by: **PL17/01/2008**	Materiál: Material:		
	Konstr.: Designed by: **PL17/01/2008**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN17/01/2008**	List: Sheet: **21** z of **22**	Číslo výkresu: Sheet number: **014-psswtbox104**	

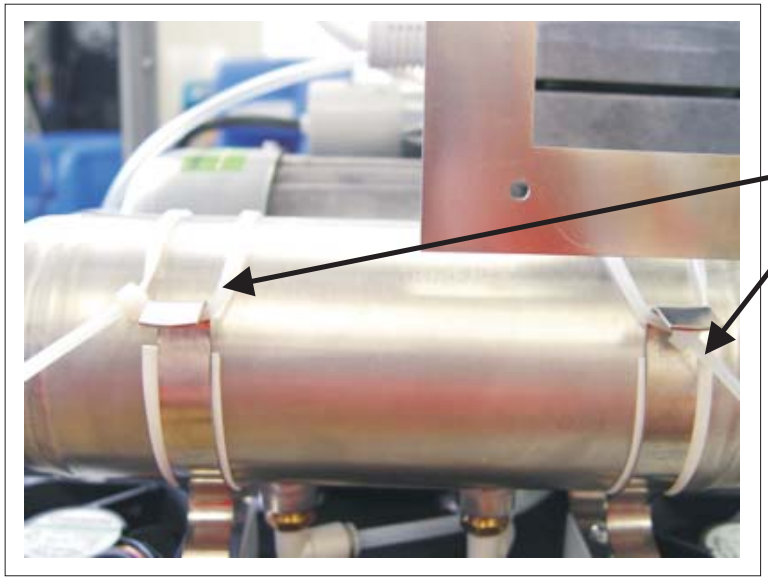
PLACEMENT OF TIE STRIPS:



KON201,202,203

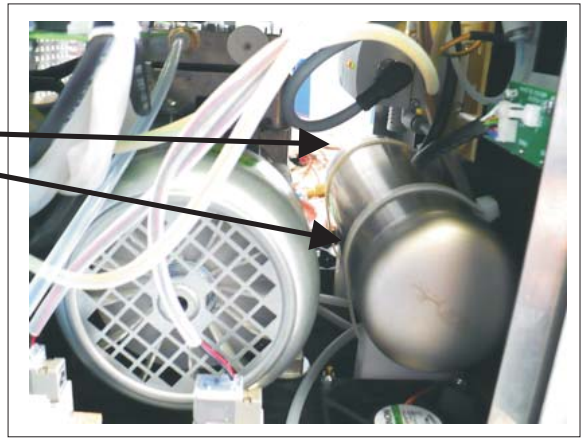


Var.A



KON205,206,207

Var.B



Název výrobku: Product name:	**BTL-014 SWT BOX**			
MEDICAL TECHNOLOGIES	Kreslil: Drown by: **PL17/01/2008**	Materiál: Material:		
	Konstr.: Designed by: **PL17/01/2008**	Povrch. úprava: Surface finish:		Měřítko: Scale:
	Schválil: Approved by: **TN17/01/2008**	List: Sheet: **22** of **22**	Číslo výkresu: Sheet number: **014-psswtbox104**	